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WILDLIFE IN NORTH CAROLINA

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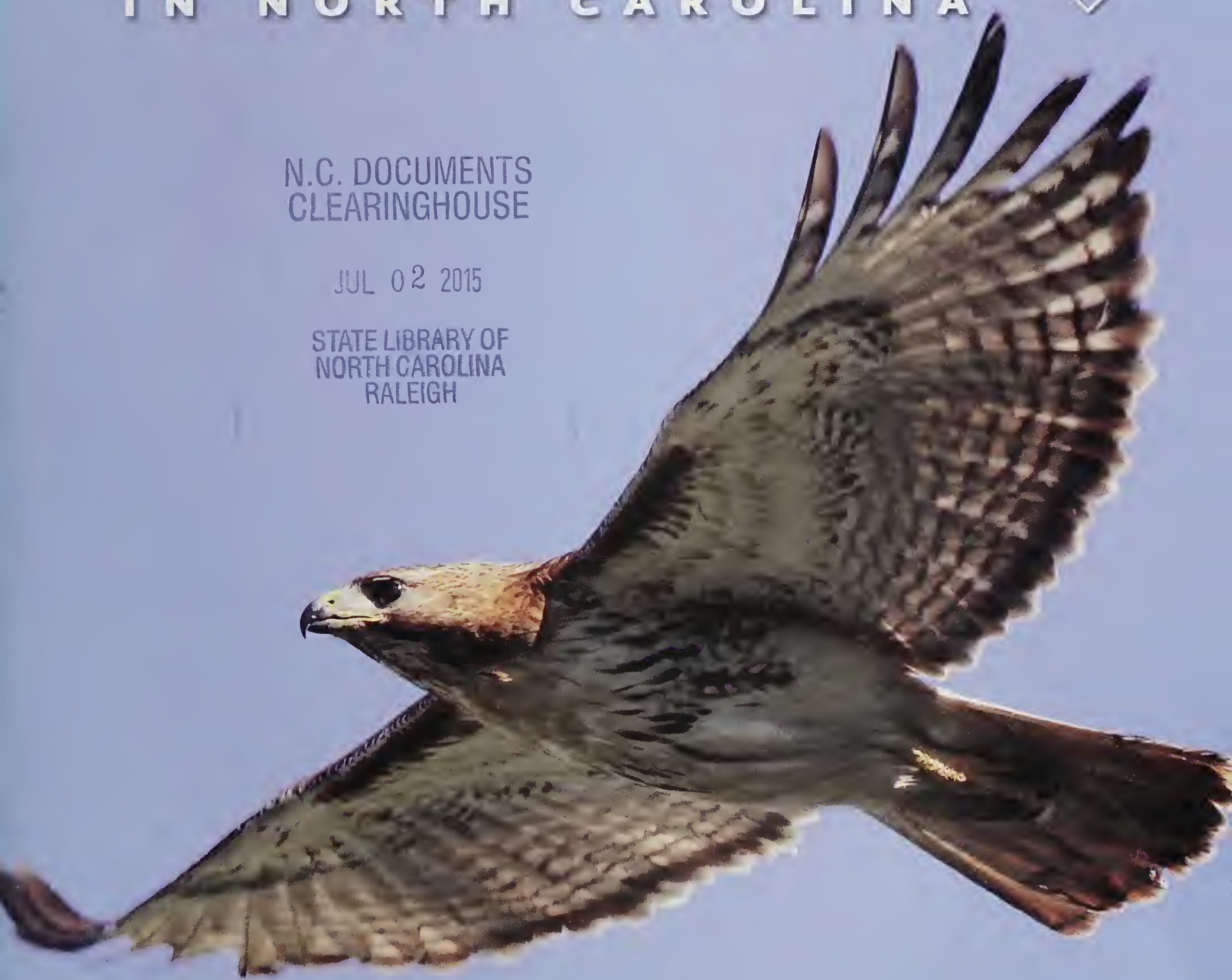

A school of tarpon swim in turbid shallow water. Known as the "silver king" among anglers, the fish is renowned for its acrobatic fight when hooked. Nearly all are released after being caught. **PHOTOGRAPH BY TOSH BROWN**

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Cover: A red-tailed hawk soars on its broad wings. It is the largest and most wide-spread hawk in North America, and it has a varied diet of small mammals, birds and reptiles. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Wildlife magazines are slaves to seasons. If it's April or May, then by George, let's have some turkey stories. And trout season officially "opens" in April, so we need a piece on that, also. In September starts a run of deer stories, an upland game story or two, followed in the waning months by waterfowl hunting.

In truth, readers whose passions are waterfowl hunting, bass fishing, trout fishing or deer hunting don't care what the month is, they just like reading about what they love to do.

That's a long-winded explanation of why I have duck hunting on my mind in July. Recently an old friend gave me a small box of books that failed to sell as he was selectively passing along some of his outdoor paraphernalia. Some of the books were keepers. (All of them have been keepers so far. Free books are like chiggers; they hang around longer than you might expect.)

The one I pulled first from the box was a classic, Gordon MacQuarrie's "Tales of Old Duck Hunters and Other Drivel." I read the book years ago and have a copy at home, but I didn't have it with me, so I immediately began to read of the Old Duck Hunters Association, Inc. (Incorrigible). MacQuarrie, of Wisconsin, wrote not only of duck hunting, but also of trout fishing, grouse hunting and deer hunting, among other things. The waterfowl hunting stories are the best, however, and include my favorite outdoor story, "The Day I Burned the Oatmeal."

MacQuarrie's stories are upbeat, often humorous, and feature the President of the Old Hunters, a character based on his first father-in-law, with MacQuarrie as the eager straight man to the President. The stories are charming, memorable slices of a simpler time. Everything, or almost everything, turns out the way it should.

Like Sir Arthur Conan Doyle in his Sherlock Holmes stories, MacQuarrie has a genius for setting scenes and making the reader want to be there. In my mind I know what his red cabin looks like. I don't need a photo; that would only ruin it. I can feel the warmth from the fireplace at night while the snow falls, and the cold of the floor in the morning and the smell of coffee, all part of the promise of ducks soon to come. MacQuarrie reminds me of something I used to be, and perhaps what I could be again.

Jim Wilson

Wildlife in North Carolina (ISSN 0043-549X) is published eight times a year by the N.C. Wildlife Resources Commission, 1751 Varsity Drive, Raleigh, N.C. 27606. Periodicals postage paid at Raleigh, N.C. and additional mailing offices. Subscription rates: one year $12, three years $30. All foreign subscriptions are $28 per year. Payable by U.S. Postal Service money order or U.S. bank cashier's check. All orders must be prepaid. Please allow 6 to 8 weeks delivery on new subscriptions and address changes. POSTMASTER: Send address changes to Circulation Manager, 1710 Mail Service Center, Raleigh, N.C. 27699-1710. Address all correspondence regarding subscriptions to Circulation Manager. For subscription help, dial 1-800-786-2721. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on audio cassette through the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., (919) 733-4376. The N.C. Wildlife Resources Commission is an equal opportunity agency. Copyright ©2015 by the N.C. Wildlife Resources Commission. No portion of this magazine may be reproduced by any means without the written consent of *Wildlife in North Carolina*.

WILDLIFE IN NORTH CAROLINA

JULY • AUGUST 2015 VOLUME 79, NUMBER 4

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Missing the Old Lures

I enjoyed your article on "Bass Bugging." I did a lot of bass fishing during the '60s and '70s, with bass bugging, being my favorite. I would take two fly-rods. One with a bass bug tied on, and the other with a bream bug. I mainly fished with the fly-rod with the bass bug attached, but if I had several bream to hit the bug in one location, I would lay down that rod and pick up the rod with the bream bug and fish out that area, before going back to bass fishing. I always caught my fair share of bass and bream during that time.

My preferred bug was a Hula Popper by Arbogast. They made two fly-rods sizes — one for bass and one for bream. I could catch a higher percentage of bites on those bugs than any other bug I ever used. I believe it was due to the rubber skirts on them. I think it felt more natural, to the fish, which gave me a fraction of a second longer to set the hook, before the fish spit it out.

A few years ago, I thought of going back to bass fishing. I was very disappointed to find that Arbogast no longer makes Hula Popper in the fly-rod sizes. Neither do they make the Hawaiian Wiggler, which I believe to be the very best spinner bait ever made. It was made in a 5/8 oz. size for casting reels and a 1/4 oz. for spin tackle. These baits also had the rubber skirts and were weedless.

Thanks again for the "Bass Bugging" article. It brought back very good memories.

Hubert M. Bowen
Greene County

Editor's Note: The small Hula Popper Mr. Bowen speaks of, the model No. 1400, was only 7/8 of an inch long, weighed 1/32 of an ounce and had a size 8 hook.

Itching to Hunt Turkeys

It was kind of ironic that I was rereading the July/August 2014 article on poison ivy just the day before the March/April 2015 edition of *Wildlife* arrived. After reading the Jim Dean article (always the first thing I read) I flipped through to see what was next. Since turkey season is just around the corner I was drawn to the story about turkey hunting.

While reading it and looking at the pictures I was shocked to see the two hunters on page eight comfortably nested in a patch of poison ivy! It's all there, leaves of three, hairy vines climbing up the tree. I know this picture was staged for the article but a better location might have been picked. I hope the hunters had no ill effects from this shot and suggest they and the photographer read the July/August edition.

Barry N. Blackburn
Swansboro

I looked at the picture in the March/April *Wildlife* magazine of the two guys turkey hunting while sitting under a tree. They must be 'itching' to hunt turkeys and made a 'rash' decision to sit in the middle of a poison ivy patch.

Sid Shearin
Littleton

Attracting More Birds

I have a request for an article in "Wildlife in North Carolina.

We have a vacation home on Kerr Lake near County Line Park. Several members of our family, including me, are avid bird watchers and photographers. We enjoy seeing the birds on and around the lake. I would like to attract more birds, including wood ducks, woodpeckers down from the tree tops, warblers, loons and blue birds. We have feeders and blue bird houses at the house, but nothing at the water. I would enjoy an article on this subject, including the use of food and houses to attract the birds.

In addition, I contacted the Corps of Engineers about placing wood duck houses at the water's edge. They referred me to the N.C. Wildlife Commission. When I called the commission they suggested that I contact the Corps regarding placing bird houses in their management area. I am sure this is an extremely rare question, so I can understand the lack of an answer. Perhaps some investigative reporting would add to and result in an interesting article.

Maybe of interest: in the spring I photographed two wood ducks that landed on a large tree branch next to the house, about 30 feet up. I thought that was unusual. Those were the only wood ducks I have seen in the area in our 24 years on the lake.

I have enjoyed the magazine for many years. The photography is outstanding.

Eugene Larson
Manson

Another Vote for More Photo Details

I wish to second the request of Norman Scalise in the May/June issue of Wildlife in North Carolina to include photo technical details (camera, lens, aperture, shutter speed and ISO) for all the exceptional photography which graces your publication, especially those of staff photographer Melissa McGaw whose images are always award-winning. The cover capture of the most recent issue was extraordinary.

You do this for the photo competition. I'm confident other readers would find such information helpful for all the stunning photographs.

Stan Broadway
Raleigh

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Summertime & the BASSIN' AIN'T EASY

WRITTEN BY BRUCE INGRAM

SOC CLAY, T

A fat smallmouth bass leaps clear of the water while trying to throw the jig 'n pig.

When water temperatures hit 68 to 84 degrees, try these patterns for river smallmouths

Sometime in May, many years on North Carolina's premier smallmouth rivers (such as the New, French Broad and Nolichucky), the water temperature reaches the mid-60s. And sometime during the dog days of August, the temps will go as high as the mid-80s before beginning a gradual descent after Labor Day.

During this four-month period, here are some favorite patterns of experts who ply these waterways.

BANKING ON SPINNER BAITS WHEN WATER IS HIGH AND DISCOLORED

Ken Trail, who guides on the New for Rock On Charters, doesn't terribly mind when summertime downpours make a mossy-back domain murky.

"Rising, muddy water forces smallmouths to the banks where they hold in predictable areas," he said. "Look for eddies, good-size boulders, downed trees and cuts in the bank — any kind of place that is a current break. That's where the fish will locate until the water starts to drop.

"Throw a bait into these areas as tight to the bank as you can. It's better for the lure to even land on the bank and be dragged into the water than for it to land a foot or more away."

AND WHAT IS THAT LURE?

"A spinner bait is far and away the best lure for muddy river water," said Trail. "You won't get many bites, maybe just one every hour or so. But those bites will come from big smallies."

Trail prefers a 3/8-ounce spinner bait with "big, thumping Colorado blades," a white/chartreuse skirt and Zoom split tail trailer. He opts for gold-colored blades most days but will switch to silver ones if the sky is clear. Spinner baits of this construction give smallmouths the best chance to see and sense this artificial.

WORMING AND NYMPHING DEEP WATER LEDGES

Deep water ledges exist on all of the state's bronzeback bastions and are major holding areas for the fish.

"On the New and other rivers, ledges typically run out from the banks," said Trail. "Good ledges lie typically in 4 feet of water, and the best ones are in 6 to 8 feet. A ledge becomes even better if a riffle or rapid dumps water into it. What I like to do is wedge a canoe or raft onto a ledge, fan cast a 30-yard section to my right and left, then move 30 yards and start again."

Trail's favorite ledge lure is a soft plastic jerkbait, the Senko, weightless and rigged wacky style with a size 2 wide-gapped Gamakatsu hook slipped through the middle of the bait. For better feel, the guide also employs 50/12 Power Pro braid and a 7-foot leader of Yo-Zuri hybrid mono/fluorocarbon.

"Let the Senko fall on a slack line, then on the retrieve keep a slight bow in the line," said Trail. "Bump the bait along, but don't stop it or a snag will happen."

Fly-fishermen can work a deep-water ledge with a sink tip line and a nymph pattern, such as a dragon or damselfly imitation.

DEAD DRIFTING SOFT PLASTIC STICK BAITS AND POPPERS

Ben Lucas, a guide for Rock On Charters, lives in Crumpler and often fishes the New and its forks. He is an advocate of dead drifting.

"During clear, low summertime flows, I like to dead drift Texas-rigged soft plastic stick baits, like Yum Dingers, through current breaks and eddy pockets," he said. "The key is to cast a bait upstream, let it fall, and every so often twitch the bait just a bit, meanwhile keeping the slack out. The drift is so much better and more natural when the bait is rolling downstream with the current than when you bring it back against the current.

"Dead drifting a fly-rod popper is just as effective. Cast a popper into the shade created by trees growing along a bank, and just let it drift with the current, keeping the slack out just like with a spinning rod. Along a river's shaded banks, various bugs fall into the water all the time. Sometimes the water will be a foot deep, sometimes much more. No matter what the depth in that shade, a smallmouth could be lurking."

BUZZING THE BANKS

Lucas, who is also the assistant director of land protection and stewardship for the Blue Ridge Conservancy, offers another go-to tactic.

Some popular smallmouth lures include (top row) Yum Dingers, a Rebel Pop-R, a Heddon Tiny Torpedo, Yum Dingers; (middle row) Betts poppers, a Clouser Minnow fly, another Tiny Torpedo; (Bottom) a Strike King buzzbait, a Booyah spinnerbait and two Heddon Zara Spooks.

MELISSA McGAW / NCWRC

"Lots of river fishermen use 1/8-ounce buzzbaits and burn them across the surface to bring up smallmouths—that's an effective technique and it's no secret," he said. "But what I like to do is tie on a 3/8-ounce buzzer and slow roll it across the surface. The bigger blade of a heavier buzzbait enables the lure to stay up on the surface better during a slow retrieve.

"That slow retrieve, I think, is better at triggering a strike than a fast retrieve. Of course, a really aggressive smallmouth is going to hit a buzzbait, no matter what its size or retrieve speed is. But for bass in a neutral mood, the slow retrieve is better at provoking strikes."

Lucas tosses a buzzer to shaded backwaters out of the main current. These could include eddies, outside bends, various kinds of current breaks, and shaded pools with plenty of chunk rock. This is a particularly effective pattern when the insect hatches take place after midday and also in the late afternoon when shadows lengthen.

WORKING STREAMERS AND TINY TORPEDOES THROUGH CURRENT

Anthony Hipps is an avid fly-tyer and angler from Lexington and suggests these strategies for brown bass in current.

"A streamer, like a Clouser minnow or Shenk's white minnow, is my choice when the water is low and clear and the smallmouths are holding in current because of the heat," he said. "I'll cast these streamers, both of them with weights on the patterns themselves, downstream along the edges of current or I'll work them down and across an area. When the streamers are directly downstream from me, I'll let them hover a bit in the current before retrieving."

Sometimes Hipps will inch these flies back in 4-inch darts; other times he will strip them hard through the water column. Always, he will retrieve by pointing a long rod directly at the fly and keeping the rod tip close to the surface. This helps keep a bow out of the line and enables him to detect the striker better and sooner. Hipps tosses streamers on 10- to 12-foot leaders, with the tippets tapering down to 8- or 10-pound test.

I like to work Heddon Tiny Torpedoes through current basically the same way as Hipps does streamers, except the Torpedo, of course, burbles along the surface. The

more aggressive the smallmouths seem to be, the faster and more violently I will rip this prop bait across the top. If the fish aren't as robust in the way they are feeding, I move the Torpedo along in little bursts with four- or five-second pauses.

CHANGING UP ON TOPWATERS

The Sneaky Pete popper is a classic river smallmouth topwater not only in North Carolina but also anywhere smallmouths swim. But if anglers want to throw a changeup to their home stream smallies, options exist.

"The standard sizes 4 to 8 poppers with rubber legs are an excellent choice if you want to show the smallmouths something different," said Hipps. "A technique that people don't often think about is to position a dropper fly, like a Bitch Creek Nymph, a Holschlag hackle fly, or a size 6 to 8 Wooly Bugger, about 18 inches below the popper on a tippet. Sometimes, the bass will just nudge the topwater but really slam the fly below."

Various terrestrial patterns, continued Hipps, also perform well including a surprise choice.

"A size 10 ant is almost never used by river smallmouth fishermen, but it's an excellent choice in August and September when the water is really low and clear," he said. "Also good are a pencil popper and Lefty's Potomac Popper. For late summer fishing, go to a lighter tippet in 5x, which is 5- or 6-pound-test."

Spin fishermen likewise have multiple options for clear, low water action. The Tiny Torpedo and the Rebel Pop-R are my two all-time favorite topwater lures for stream smallies, but the Storm Chug Bug, Heddon Zara Spook, Rapala Skitter Pop, and Phillips Crippled Killer are just a few of the artificials that will give the smallies a different look.

BUMPING AND CRANKING MAIN CHANNEL STRUCTURE

Kevin Howell, who operates Davidson River Outfitters in Pisgah Forest, said that when the water drops; rain is scarce and the smallies move to the little deep water left along the main channel, he has a plan.

"The black Meat Whistle sort of looks like a leech, but the best way to work it is slow and deep like a streamer," he said. "Don't let this fly fall all the way to the bottom, but do let it sink far enough so that when retrieved, it bumps along just above the rocks. Especially look for dropoffs and deeper water along the main channel."

MELISSA McGAW/NCWRC

Crankbaits can be similarly effective for spin fishermen faced with deep water smallies lurking in the main channel. A Bomber Model A, Cordell Big O and Rapala Shad Rap are just a few of the many possibilities. Retrieve these artificials so that they careen against rock and wood cover; when the lure is veering off from a rock is when strikes often occur.

GOING TUBING

I've used tubes to catch smallmouths on New Year's Day and Midsummer's Eve, and when the water temperature was in the low 40s and mid-80s and everything in between. I don't think tubes look like crayfish in our hands, but they certainly do when they are flitting through the water column or bumping across the bottom. Rig them on a 2/0 or 3/0 hook and with a sliding bullet sinker anywhere from 1/16-ounce to 3/8-ounce and prepare for a strike.

Tubes are best worked Texas style along the bottom to maximize their crayfish imitating capabilities. Howell likes the ability of a crayfish pattern to attract deep water smallies just like the tube does.

"A weighted NearNuff crayfish is extremely effective when it's slowly stripped through a rocky pool," he said. "Use floating line and a 4- to 5-foot leader for this fly. Besides deep water rocky pools, try sandy eddies and points."

Howell adds that the black Meat Whistle is a good choice here, as is the size 6 Big Nasty, a bogus mud bug.

PRAISING THE POP-R

Earlier I mentioned the Rebel Pop-R as one of my two favorite topwaters, along with the Tiny Torpedo. I think that the biggest advantage that the Pop-R has over the Torpedo is that the former is better at enticing smallies in a neutral mode to strike. If the bass seem lethargic, you can dead drift the Pop-R, return it at medium pace with a gentle popping motion, or churn it across the surface, making it pop-spit-and bloop.

One of many aspects that I enjoy about river smallmouth fishing is trying to figure out the pattern or patterns that will work on any given day afloat. Each morning before I go fishing, I plan what will be the first half dozen or so patterns I will try and the half dozen or so backup patterns that I had better have available. Perhaps you can add the patterns discussed here to your arsenal. ◆

Bruce Ingram is the author of five books on river smallmouth fishing, among them "The New River Guide" and "Fly and Spin Fishing for River Smallmouths." To order and/or to read his weekly blog on the outdoors: bruceingramoutdoors.com.

Freshwater mussel propagation at Marion Hatchery is an one tool in the toolbox of conserving sensitive wildlife species

Flexing Their MUSSELS

Written by Mike Zlotnicki | Photographed by Melissa McGaw

It doesn't look like much of anything at first, just an old tractor shed, which it was a decade ago. Today, this old tractor shed carries the title Conservation Aquaculture Center at the Marion State Fish Hatchery.

The N.C. Wildlife Resources Commission's mussel breeding program helps augment some declining populations and save others from extinction. There are about 17 places in the United States that grow freshwater mussels, but many of those are for research purposes. The Marion facility has held 17 of the approximately 50 species in North Carolina and has propagated seven species to bolster local populations throughout the state. Biologists Rachael Hoch, David Deaton and Peter Lamb are leading the effort in Marion with the help of the NCWRC's Aquatic Wildlife Diversity Program staff.

Steve Fraley, the Western aquatic non game coordinator for Inland Fisheries, examines a pit-tagged mussel during field work in the Pigeon River.

"My interest has always been in conservation," says Hoch after she guides some visitors on an impromptu tour of the facility. "I took an AP environmental studies class in high school my senior year and fell in love with the field of conservation biology. After graduating from college, I worked as a research technician for two years. We toured the whole Southeast doing aquatic species inventories and surveys. I distinctly remember the first time I saw a freshwater mussel lure in the wild; I was hooked, just like the host fish. During this time, we saw some truly wild places and rare species, some places were better than others. We also faced our fears, swimming with some not so nice things like alligators. The southeastern U.S. has some of the highest diversity and highest rate of imperilment of freshwater mussels. It was really eye opening.

"Freshwater mussels are an underappreciated group. While they may not be as charismatic as a bear or mountain lion, they have their own charm and mystery. They play an important role in the ecosystem by filtering our water, stabilizing the stream bed, providing habitat for aquatic organisms, and are even a food source for fish, birds and mammals. Unfortunately over 70 percent of freshwater mussels are imperiled in the U.S. because of habitat degradation and loss. So, I went back to graduate school to study how factors such as, dams, beavers and humans, were affecting freshwater mussels in North Carolina. As part of that research, I needed to propagate mussels."

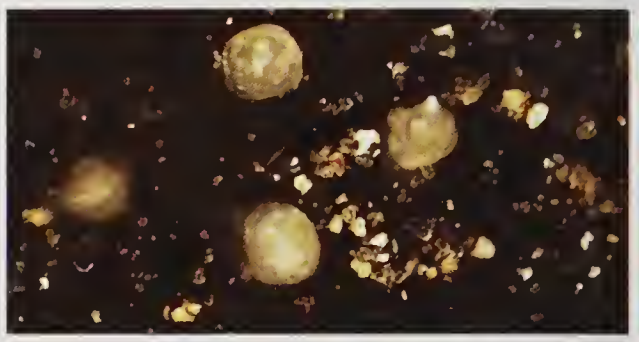
In 2012, a temporary technician position opened up at Marion while Hoch was still doing her masters. So, she worked 40 hours a week in Marion, went to school at Appalachian State University full time, conducted her field research in Raleigh and lived in Asheville.

"I did pretty well basically running this giant triangle," she says. "Most of my course work was done, but I was still a full-time student. I think I kept my sanity because I felt like I was making a difference for the species."

Deaton has been with the commission for 15 years, starting out as a fisheries technician at Table Rock Fish Hatchery.

"In 2005 I was promoted to the fish culture technology center biologist position where I was working with all the commission hatcheries to identify, develop, and implement new methods or technologies into our hatchery system to improve efficiency and meet changing management goals. This included developing techniques for propagating new species.

"Steve Fraley, Western Region Aquatic Wildlife Diversity Coordinator, was instrumental in getting the mussel propagation program started. He was already working with Chris Eads from N.C. State University on mussel propagation work. Chris was developing techniques for successfully producing mussels but was limited in his ability to hold



STEPS IN **MUSSEL PROPAGATION**

1. For broodstock, gravid female mussels are collected from the wild and brought to the hatchery to be used for propagation and immediately returned to the stream, or mussels are collected from the wild and brought to the hatchery for long-term holding, thus creating a broodstock.

2. Glochidia (larvae) are extracted from the gills of gravid mussels and are used to inoculate the fish host. The glochidia encyst on the gills and fins of the fish.

3. The host fish are held in metamorphosis systems from 2 weeks to 2 months until the mussels begin to drop off the fish.

4. Staff enumerate the number of metamorphosed juveniles using the microscope and transfer them to the early-rearing systems.

5. Once mussels are greater than 1 mm, they are transferred to long-term grow-out. Some are grown on sand in the black tubs and others are grown on screens in upwellers in the pond. The type of long-term grow-out is dependent upon the species.

6. Mussels are tagged using a laser engraver or a small plastic tag so that commission staff can monitor the animals in the wild.

7. Mussels are stocked into streams that support suitable habitat and have been identified as priority restoration areas. They are monitored using surveys and more recently can be tracked using a passive integrated transponder (PIT) tag

and grow the animals in large numbers. In 2005, some initial systems were set up at Table Rock hatchery and McKinney Lake hatchery to grow the mussels that Chris produced in larger numbers. In 2007, we had some issues with mortality in those animals at McKinney Lake and Table Rock, so we were looking at other options. It was during this time that I decided to look at the Marion hatchery. We had just completed some renovations at Marion and had access to water supplied by one of the ponds at the facility."

The pilot program was extremely modest to start. It took place in a small Rubbermaid tool shed with some small containers of mussels brought by Eads from the N.C. State facility. It wasn't climate controlled and they were running water straight from a pond, to the mussels, through a filter, and back to the creek.

"We did a pilot study here in 2007 to see if they'd survive and grow on the water supply," said Deaton. "They did well; it was successful. During this time, it was decided that we needed to pursue doing some propagation work in order to produce the number of mussels needed to meet our goals. Eads assisted by sharing his knowledge of propagation techniques and the equipment needed and Fraley pursued seeking funding from sources like the Cheoah River Restoration Fund and state wildlife grants to convert an old tractor shed at Marion into the Conservation Aquaculture Center."

EXPLORING the shed

The shed has two rooms. One is dedicated to early development and rearing of the mollusks. On one side several different species of fish are held in aquariums to be used as hosts for mussel larvae. In order for freshwater mussels to complete their life cycle, they must use a host fish. Certain mussels can require a certain species of fish. For example, the Tar River spinymussel utilizes white shiners as host fish while the Appalachian elktoe uses mottled sculpins. The other room is for long-term grow-out and holding or "arking," which is maintaining individuals of a species at the hatchery that have lost suitable habitat in the wild. In the other room some 80 plastic bowls that look like giant bundt cake pans hold the animals with PVC drip pipes providing

See Nature's Ways, page 22

PARTNERS:

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N.C. Heritage Program

N.C. Division of Water Resources

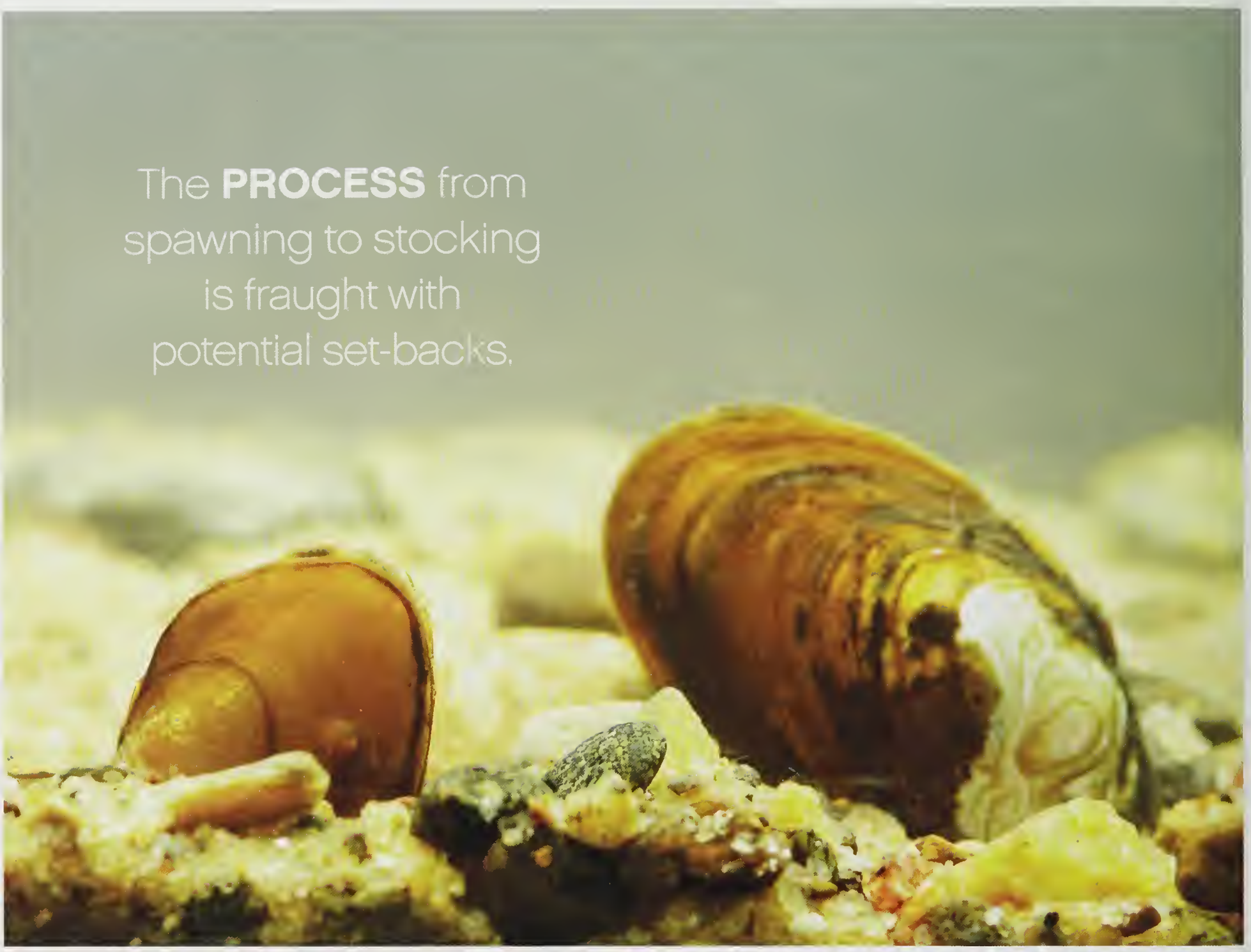
FUNDING SOURCES:

Section 6 of the Endangered Species Act

State Wildlife Grants

Preventing Extinction Grants from USFWS

Nongame and Endangered Wildlife Fund



circulation. The white PVC pipe runs everywhere and the design of the system is unique to the site as Deaton, Lamb and other staff have had to learn and build as they went along. While not exactly luxurious, the shed is a model of efficiency and ingenuity, although a faint odor akin to wet canvas sneakers lingers.

The **MUSSEL** mating game

During spawning, male mussels release sperm into the water. The sperm passively drift with the water current and may enter a female of the same species while she is siphoning.

The fertilized eggs develop into larvae called glochidia, which look like little microscopic Pac-Men and are held in the female's gills for future release. Once released, the glochidia of most freshwater mussels find a host fish and attach to the gills or fins of that fish. That can happen in several different — and remarkable — ways. Some glochidia float along and are "eaten" by a fish, but most will end up on the gills and not in the belly. Other glochidia are suspended in the river by the mussel and attach to a fin as the fish swims near them. This process does not hurt the fish and can last anywhere from two weeks to several months.

Females of several species have developed ways to increase the chance of contact between the larvae and the fish with the aid of "fishing lures" on their mantles. Some look like a darter (a small bottom-dwelling fish), some like worms. This is pretty incredible for an animal that has no eyes.

When a hungry fish spies what it thinks is prey, it attempts to eat the lure and instead gets a mouthful of larvae or a conglutinate, which is a small packet of glochidia. Once the glochidia have successfully attached to the fish host, they metamorphose into juvenile mussels, developing internal organs. When metamorphosis is complete, they detach and fall to the bottom to begin an independent life as a filter feeder. In the lab it takes about two to three years from larvae to adult before they can be stocked. Individual mussels are marked with laser etching or other methods to identify them in the wild.

The process from spawning to stocking is fraught with potential set-backs.

LEARNING as they grow

"Each species has different requirements," says Hoch. "The Appalachian elktoe, a federally endangered species, and the slippershell mussel like cool water, high flow, and a little sand, 59–64F, in the 60s. Tar River spiny-mussel likes warm water, 73F, moderate flow, and screens. Understanding the requirements of each species is critical for successful propagation and survival upon release. During captive propagation, we attempt to mirror the natural temperature regimes to better prepare the mussels for stocking. But last winter, the long-term grow-out side of the shed got down

Opposite, Tar River spinymussels are a federally protected species. Left, wavy-rayed lampmussels are tagged with both PIT tags (below) and alphanumeric tags.

to 36C, just above freezing. Our intakes froze, and we were out there busting ice making sure our incoming water didn't freeze. We want to have a cool period in the winter time so that the mussels start spawning and producing glochidia, but that may have been a little too cool."

Peter Lamb has 13 years of experience with the commission. His partnership with Hoch is being the builder to Hoch's vision when it comes to building systems to house the animals.

"The water circulation system is half pieced together and half past experience," he says. "We learn as we go. I don't have any technical engineering skills, but I have three generations of engineers in my family. From a personal perspective, it's the challenges it presents, because so much is not known. We still don't have a really strong handle on what they actually eat or gain nutrients from, but we are conducting research to better understand their requirements. Everything we do is pioneering and that's really cool and that's probably my favorite part."

Working in such uncharted territory means you can fail and not really know why or how it happened. Lamb learned that first hand in the early stages.

"We work with very small organisms that feed on very small organisms in surface water," says Lamb. "Surface [non-treated] water is 'alive' and is very difficult to screen, and it's very difficult to exclude the harmful organisms from getting in while allowing the beneficial stuff through without those screens clogging all the time. Also, our biggest predator is flatworms, which are pretty small. My idea was to feed artificially and eliminate surface water by using well water and that would keep the flatworms out. It turns out, there's something in the surface water that we don't provide in our food that they have to have. And I proved that!"

Consequently, the 2011 propagation totals were pretty low, compared to other years. But, the crew at Marion has produced over 84,000 mussels and stocked over 34,000 since inception of the program.

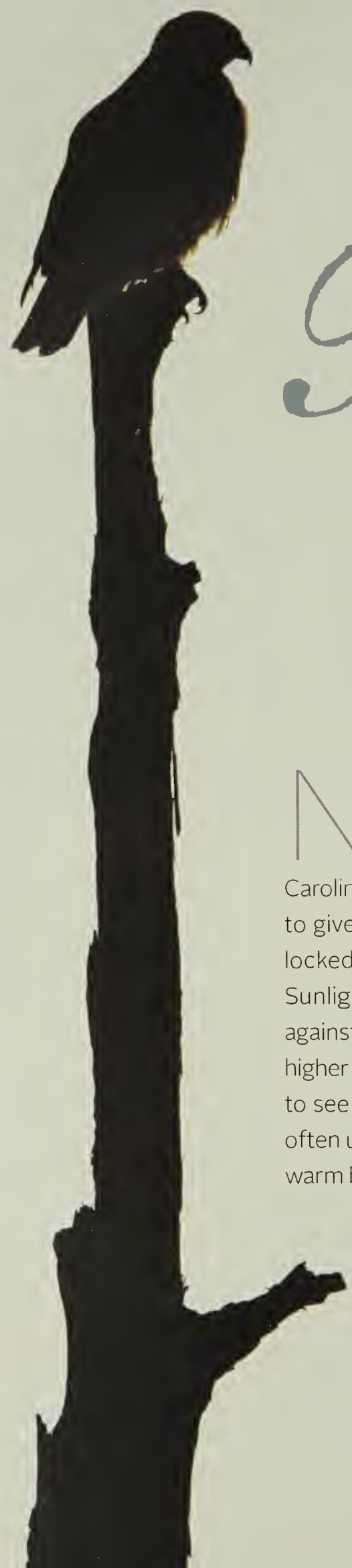
Kyle Briggs is the section chief of land and water access in Raleigh, but was the fish production supervisor in Marion for the start of the program. He gave a lot of time — and part of his left ring finger — to the project during the building of the grow-out area of the shed.

"If you look at our statutory mandate our mission isn't to conserve sport species, it's to conserve wildlife species," says Briggs. "Mussels are part of the ecosystem. The goal behind our Wildlife Action Plan is to keep common species common. Freshwater mollusks are some of the most threatened species in the nation from habitat loss and pollution, so really our goal is to keep the species common and if possible, delisting of those species that have been listed.

"There are very few places in the nation doing this type of work and the majority of those are research facilities, not propagating to grow out and put in. That's a state agency mission. We're on the front edge of this. The commission is about applied management. If you can't apply it to the field, if we're not raising enough to stock, why are we really doing it?"

Hoch has her own source of pride for the program. "My individual perspective on it is that I'm just passionate about our state's rare species," she says in a break room at the 16-acre Marion hatchery. "I want to make a difference. I want to help restore our state's species, and their habitats. And the fact that on your most terrible day — you can go in that building and pick up a hundred of a federally endangered animal and hold them in your hand. That is why I do what I do." ◆

Mike Zlotnicki is the associate editor of Wildlife in North Carolina. *He may be reached at 919-707-0175.*



Carolina Redtails

Red-tailed hawks are common and successful, yet that doesn't detract from their spectacular beauty.

written and photographed by **Todd Pusser**

Not long ago, standing outside in the backyard of my youth, I heard the distinctive cry of a red-tailed hawk. Shielding my eyes with one hand against the bright spring sunshine, I stared intently at the Carolina blue sky searching for the source of the piercing call. I was just about to give up looking when the call rang out again. Kreeeer!!! My eyes finally locked onto the raptor, high up, circling on the winds of a hot-air thermal. Sunlight shone through the edges of its wings causing the hawk to glow against the brilliant blue sky. The redtail continued to circle above the yard, higher and higher, until finally disappearing from sight. Despite being unable to see the bird any more, I could still hear that distinctive, raspy kreeer, so often used by Hollywood directors to convey a sense of wildness, above the warm breeze.

For any North Carolinians who spend time outside, the red-tailed hawk is likely the first bird of prey encountered, though many may not know what they are looking at. The hawk's large size frequently confuses casual observers who mistake them for eagles. Red-tailed hawks belong to a genus of birds known as Buteos, large broad-winged hawks that range worldwide across continents and remote island groups. In North Carolina, the red-tailed hawk is the most common bird of prey, found in a wide variety of habitats, from the peaks of our highest mountains to the wide expanses of farm land in our Coastal Plain.

Red-tailed hawks are spectacular birds, reaching lengths of 2 feet and sporting a wingspan over 4 feet. Adult redtails in North Carolina typically have white breasts streaked with brown feathers and striking brick-red colored tails which give the species its common name. Red-tailed hawks throughout their range in North America exhibit highly variable color morphs ranging from a pale, nearly white form, known as Krider's hawk, of the Great Plains to the completely black Harlan's hawk of the Northwest. Some of these color morphs are so distinct that they were recognized as separate species by ornithologists for many years. Today it is generally accepted by the scientific community that the red-tailed hawk is just one, wide-ranging, highly variable species.

Albino red-tailed hawks are not uncommon and are regularly reported throughout the species' range, including North Carolina. Honeysuckle, a brilliant white red-tailed hawk, was for many years, a resident of the Carolina Raptor Center, a facility near Charlotte that rehabilitates injured birds of prey. Honeysuckle, a victim of a gunshot wound to the wing was somewhat of an area celebrity, seen by thousands of people during her time at the center, before being sent to another facility for research.

To see a red-tailed hawk in North Carolina, simply get in your car and take a drive down any major highway in the state. Red-tailed hawks love to hunt road rights-of-way. They frequently perch in plain sight on trees and fence posts bordering four-lane roads throughout the state. Trash thrown out of vehicles by careless motorists attracts rodents, which in turn attract predators such as hawks. During late fall and winter, when leaves are off the trees, red-tailed hawks are easily

observed, white breasts ablaze, perched from high vantage points, patiently scanning open areas for a meal.

As a young boy, I was obsessed with the outdoors and nature. Birds of prey were among my favorite animals and red-tailed hawks, in particular, held a special fascination. It was a tradition for my family, like many others, to venture out the day after Thanksgiving to go Christmas shopping. While I was never interested in the mall or Black Friday sales or the large crowds, I always looked forward to the 70-mile drive from our home in Eagle Springs north up Interstate 74 (then Hwy 220) to Greensboro. The drive that time of year happened to coincide with the peak migration movements of hawks, and it was common to see red-tailed hawks perched in trees along that route every few tenths of a mile. My father and I would make a game of it to see who could spot the most hawks. Never have hour-long drives passed by so quickly. I would sit, face pressed up tight against the backseat window, staring intently at every tree and fence post that whizzed by at 60 miles per hour, hoping to catch a glimpse of the distinctive silhouette of a perched redtail. We would count aloud every hawk observed and tease each other for missing obvious birds. Our highest count for the trip, one way, was 36 red-tailed hawks.

The Consummate Predator

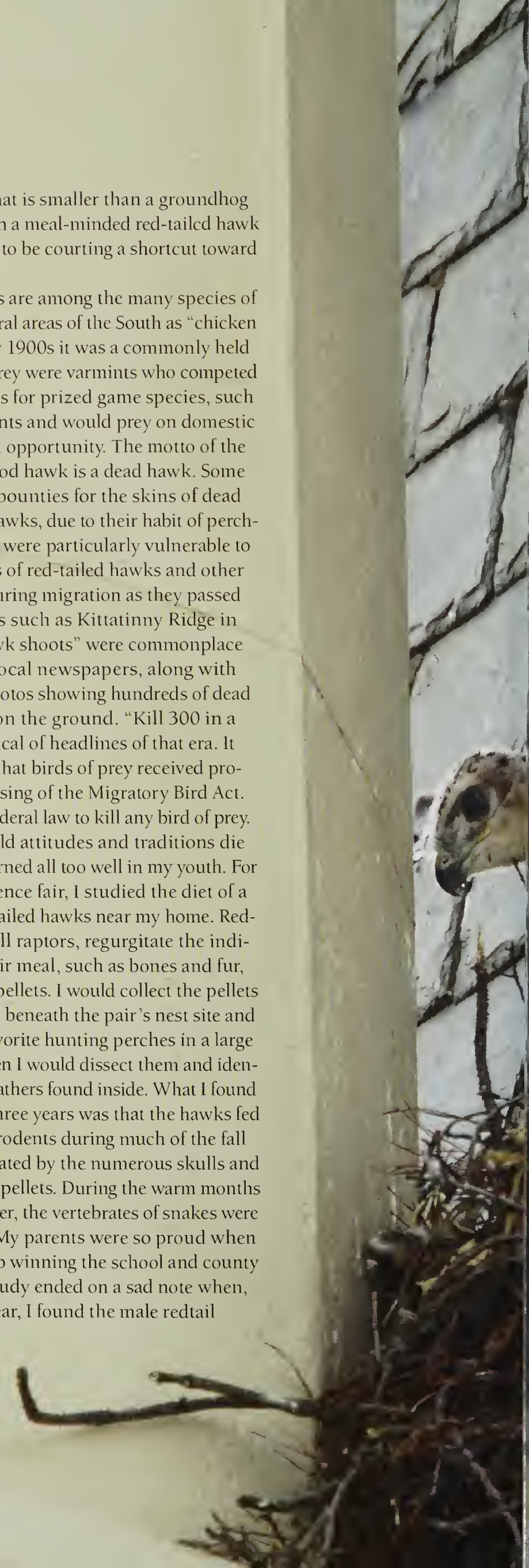
While many species of birds of prey have shown marked declines in population sizes across the continent, red-tailed hawks seem to be increasing in numbers. The key to the species success is its ability to adapt to a wide variety of environmental conditions and its versatility in prey selection. Like other highly adaptive animals, such as raccoons or coyotes, red-tailed hawks have learned to exploit human-induced changes to our natural environment. Studies have shown that the clearing of land for agriculture, commercial development and highway construction have actually benefitted the redtail, creating open habitats that the species seems to prefer. Man-made structures provide excellent vantage points for hunting hawks and in some cases even nesting sites.

With extraordinary eyesight and powerful talons, red-tailed hawks are consummate predators. Though rats and mice figure prominently on a redtail's menu, the opportunistic hawk will eat whatever it can find. Chipmunks, squirrels, rabbits, gophers, frogs, pigeons, grasshoppers and beetles are all eaten. The hawks commonly catch snakes, even venomous rattlesnakes and coral snakes. Perhaps the authors of the field guide "Hawks in Flight" summed up the redtail's diet best by stating "Any furred, feathered, or scaled creature that is smaller than a groundhog and turns its back on a meal-minded red-tailed hawk might safely be said to be courting a shortcut toward the cosmic."

Red-tailed hawks are among the many species of raptors known in rural areas of the South as "chicken hawks." In the early 1900s it was a commonly held belief that birds of prey were varmints who competed with human hunters for prized game species, such as quail and pheasants and would prey on domestic poultry at any given opportunity. The motto of the day was the only good hawk is a dead hawk. Some states even offered bounties for the skins of dead hawks. Red-tailed hawks, due to their habit of perching out in the open, were particularly vulnerable to the gun. Thousands of red-tailed hawks and other raptors were shot during migration as they passed near lookout points such as Kittatinny Ridge in Pennsylvania. "Hawk shoots" were commonplace and advertised in local newspapers, along with black-and-white photos showing hundreds of dead hawks strewn out on the ground. "Kill 300 in a single day" was typical of headlines of that era. It was not until 1972 that birds of prey received protection with the passing of the Migratory Bird Act. Today it is against federal law to kill any bird of prey.

Unfortunately, old attitudes and traditions die slowly, a lesson I learned all too well in my youth. For my high school science fair, I studied the diet of a nesting pair of red-tailed hawks near my home. Red-tailed hawks, like all raptors, regurgitate the indigestible parts of their meal, such as bones and fur, into small odorless pellets. I would collect the pellets lying on the ground beneath the pair's nest site and from under their favorite hunting perches in a large field near home. Then I would dissect them and identify the bones and feathers found inside. What I found over the course of three years was that the hawks fed primarily on small rodents during much of the fall and winter, as indicated by the numerous skulls and jawbones inside the pellets. During the warm months of spring and summer, the vertebrates of snakes were commonly found. My parents were so proud when my project ended up winning the school and county science fairs. The study ended on a sad note when, during my senior year, I found the male redtail dead beneath his favorite hunting perch, a victim of a gunshot wound through the chest.

According to statistics from the



Red-tailed hawks are typically monogamous and pairs stay *together for life.*

A young red-tailed hawk stretches its wings inside a large nest on the First Baptist Church high above the streets of downtown Raleigh. Skulls of rodents inside regurgitated pellets (right inset), found under nest sites, offer clues to the hawk's diet.

Redtails are easily observed throughout the state hunting from perches such as the top of buildings, dead trees and power poles. This conspicuous behavior makes the hawks vulnerable to "mobbing" attacks by songbirds, such as this pair of mockingbirds (below left).

Carolina Raptor Center, of the more than 1,764 red-tailed hawks treated at the facility since 1977, the primary cause of injury for over 60 percent of birds was being hit by automobiles. A more sobering statistic, however, shows that 23 percent, nearly a quarter of all redtails treated, were victims of gunshot wounds. Old habits and beliefs really do die hard. Despite these facts, the tenacious redtail is holding its own and is showing up in greater numbers in the most unexpected places.

City Hawks

In 1993, a pair of red-tailed hawks made international headlines when they built a nest atop one of the swankiest penthouse homes on 74th Street and Fifth Avenue in New York City. Over the years, the male, known affectionately as Pale Male, and his mate successfully raised over two dozen chicks high above the hustle and bustle of America's largest city. Their exploits attracted an enormous and devoted group of followers and inspired a best-selling book called "Redtails in Love" as well as an Emmy Award-winning documentary on PBS.

Less well known are the pair of red-tailed hawks that took up residence on the steeple of the First Baptist Church, across from our State Capitol building, in downtown Raleigh in 2011. I first became aware of this pair of nesting city hawks by reading the online blog "Raleigh Raptors" by nature enthusiast and photographer Jordan Paw. He has spent countless hours following the hawks and their offspring over the last several years and his photos of the hawks perched on various downtown buildings inspired me to travel to Raleigh to see the birds for myself.

I have visited the downtown nest site several times over the last three years. The first thing you notice when

you look up at the First Baptist Church is the immense stick nest nestled in the crook of the steeple. Red-tailed hawks are typically monogamous and pairs stay together for life. They frequently reuse a nest year after year, which has been the case for the downtown Raleigh birds the last four years. The nest on the Baptist Church is nearly 3 feet across. Red-tailed hawks typically lay between one and five eggs which they incubate for nearly 35 days. Once the chicks hatch, it usually takes the parents around 45 days to fledge them.

My most recent visit to the nest site was last April. From the street, I could easily see the fuzzy white heads of two chicks sticking out above the wooden sticks of the nest but failed to see either parent. Walking slowly around the grounds of the State Capitol, I scanned the roofs of surrounding buildings in hopes of glimpsing one of the adult hawks. Above the sounds of the morning traffic and honking horns, I noticed the loud alarm calls of nearby mockingbirds and blue jays. Songbirds and crows will often gather in numbers to harass or "mob" a flying or perched hawk in an effort to chase the predator away. Mobbing also serves to alert other birds in the area to the presence of a potentially dangerous predator, a risky behavior for birds that approach too closely to the raptor. Crows in particular, seem to relish in their mobbing behavior of passing hawks and owls. My father recently told me of watching a red-tailed hawk wheel about in mid-air to strike a careless crow with its outstretched talons, knocking the annoying bird to the ground in a flurry of black feathers.

Cueing in to the loud cries of the mockingbirds and jays, I finally managed to glimpse an adult bird perched in a tree near the statue of Sir Walter Raleigh. No doubt the bird was hunting gray squirrels and pigeons that frequent the grounds of the Capitol in an effort to feed its demanding and fast growing chicks. Seemingly annoyed, the hawk took flight, leaving the belligerent songbirds behind, and landed on top of a nearby building. I spent the better part of an hour just watching the adult through binoculars as it sat on the edge of the building patiently scanning the sidewalks and mowed lawn below, occasionally preening its feathers. Business men and women, decked out in their suits and skirts with briefcases in hand, walked briskly down the sidewalk toward the Capitol Building, oblivious to the eyes of the watchful predator sitting overhead.

Finally the hawk launched from its observation point and began to soar higher and higher above the streets and traffic toward the white cumulus clouds overhead. My binoculars could not bring it back. I wondered if it was still hunting or just taking it easy, wings spread wide on a hot-air thermal. I will never know the answer, but one thing is for sure. The view of downtown Raleigh from up there must be spectacular. ◆

Todd Pusser is a marine biologist and frequent contributor to Wildlife in North Carolina.

Passage of the Silver Kings

In pursuit of food, tarpons follow their appetites to the Pamlico Sound each summer.

An angler's passion for the fish he most likes to pursue is born of a wide range of emotions and reasoning often far too abstract to fully understand. While some fish are hefty examples of brute strength, others are elusive and require a seemingly endless supply of patience. Some are both.

These are the creatures that conjure visions of grandeur, a true sport fish whose greatest purpose is to inspire and challenge the fortitude of even the most seasoned anglers. Every summer for a period all too brief, North Carolinians are graced with the opportunity to target just that, the living embodiment of sport fishing itself, the tarpon.

While a relatively small sect of anglers are well aware of the presence of *Megalops atlanticus* (Atlantic tarpon) in the Pamlico Sound, many North Carolina natives are unaware that the same fish that caused Islamorada, Fla., to be designated as the sport fishing capital of the world will venture as far north as Chesapeake Bay, Va., during its summer migration.

written by **DUSTY WILSON** >> << *photographed by* **TOSH BROWN**

Maybe it's best that way. Tarpon addicts are a serious lot, forever changed by a relatively brief encounter with a prehistoric powerhouse. Their quarry is not for the faint of heart. Bleary-eyed anglers scan the water's surface for hours on end; drenched in sweat and salt spray they wait, languishing for a glimmer of hope. A glint of silver scales, a crab or menhaden slurped from the surface or a free-jumping tarpon. At the scantest of offerings they race to position their vessel in front of that fish, calculate wind speed and direction, toss out their baits and again wait. What happens next is nothing short of a divine miracle to a tarpon addict.

"You can't describe the sound that line makes when it cuts through the water," said Capt. Mitchell Blake in regard to speed of the take. "It's like nothing you've ever heard before." Blake, who heads Fish IBX Charters out of Chocowinity, admits that tarpon fishing is as much an obsession as a business venture. "When you put that much energy on the end of the line and that fish goes aerial, it's unbelievable."

The acrobatic flips and jumps that tarpons are known for only make the fish more difficult to land and further solidify its reign as the silver king. A fish upward of 100 pounds hurling itself from the water again and again with the ease of a playful minnow is a memory no one so fortunate to observe is soon to forget.

Due to Blake's tarpon addiction, he always has an eye peeled for any signs that would point to the arrival of the summering fish, as in this case he recounted of one July past. "I was guiding a mixed bag trip for red drum, flounder and speckled trout when I saw a school of tarpon rolling on the Pamlico Sound," he said. "In order to keep an eye on them, I started to focus my charters in this area. The next thing I noticed, this school is pushing up the Pamlico River and into the Pungo River."

> "When you put that much energy on the end of the line and that fish goes aerial, it's unbelievable."

Without a tarpon on the books for that season, Blake set his sights on breaking the ice. He who captures the first tarpon of the season carries bragging rights, a feather in his hat if you will among the faction of tarpon anglers. With a history in Fish and Wildlife Management, Blake planned on this occasion to get his entire family involved in an up-close and personal science lesson. His wife, their two small children and a couple of close friends were in for a real treat, because this outing would be extraordinary.

After days of watching these fish and studying their behaviors, Blake was finally given the opportunity to put his crew on the fish of a lifetime. "We

had the kids in the boat, and I knew they were thinking we were going to just go goof off and have fun, but I'd done my homework on this school and I knew where they would go when they came into the Pungo," said Blake.

Catching skates and rays is commonplace when fishing cut croaker and spot for tarpon, and everyone was finding plenty to stay occupied while Blake kept an unblinking gaze on the waters around him. "Any minute" he thought, "Any minute." As the sun sank lower into the sky, a portrait of color was cast onto the Pamlico background and Blake knew it was now or never.

Within minutes, an eruption of tarpon pierced the river's placid surface while simultaneously cutting a swath through it with braided fishing line. "Tarpon!" he shouted. The children, startled as the fish pulled the line tight and slammed the rod in its holder, were brought to attention and stood wide-eyed staring at the spectacle in front of them. Each leap froze time as the mighty fish defied gravity and shook violently before inevitably crashing back into the water.

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Growing weary of its failed attempts to throw the hook, the tarpon preceded to empty Blake's spinning reel of its contents in a blistering run that would not be subdued. "I'm coming off anchor," declared Blake, as he took to the helm and positioned his angler on the bow in a calculated attempt to acquire lost line and gain leverage on the fish.

He chased the relentless tarpon across the mouth of the Pungo River and into a hazardous string of crab pots. To avoid disaster, he maneuvered his vessel above the fish and coerced the fish back into open water. A tug of war ensued, but shortly thereafter, they coaxed the weakened trophy within handling range.

Blake paused momentarily to allow his captive audience the opportunity to soak in the experience and see first-hand what most would only see in photographs. After grabbing his 100-pound fluorocarbon leader, which signifies a caught fish, Blake plucked the 8/0 snelled circle hook from the monster's jaw, and allowed it to rejoin the school to fight another day. "The kids still talk about it. When you take them out to the same place that we swim, water ski and catch smaller fish, and show them a 6 1/2-foot fish throwing down, it makes quite an impression," said Blake.

Tarpon are most often associated with the crystal clear flats of the Florida Keys and fly-fishing, with a guide perched atop a poling platform pointing to a fish he can see well below the water's surface.

Left, a tarpon leaps, attempting to throw an angler's lure. Top, tarpon have hard, bony mouths that make hook-ups hard to achieve. Below, not considered table fare, the vast majority of tarpon are released after landing.

Pamlico Sound anglers aren't so fortunate. Although tarpon will readily inhale a well-placed fly, North Carolina anglers are lucky to briefly identify what general direction a fish is heading, much less properly lead it and drop that fly within striking distance. The stained waters of the sound and its tributaries are relatively unforgiving in terms of visibility. It is for that reason most choose cut bait to appeal to the sense of smell and cover a broader area in the vastness of the sound.

Above, an angler resuscitates a small tarpon before it swims off. Right, adult tarpon are nomads, constantly on the move, and can be found up pure freshwater rivers and offshore in the Gulf Stream.

But how did we become so fortunate to have tarpon in North Carolina? Why would a fish that spends most of its time in a tropical paradise transit to our backyard? The answer is not as deep and mysterious as one may think.

According to Dr. Jerald Ault, who heads the Tarpon and Bonefish Research Center at the University of Miami, the primary function of this northern migration of tarpon is to build body mass after completing the rigors of spawning offshore of the Florida Keys. Weakened and hungry, tarpon follow their stomachs to find buffet lines of blue crabs, shrimp, mullet and menhaden half way up the East Coast.

After all, a fish reaching 100 pounds and up to more than 200 pounds can't afford to sit back and nibble on hors d'oeuvres. It must be deliberate about its meals and go for the main course. "I liken the migration pattern to the lions and wildebeests of the great Serengeti, in the extensive pilgrimages they make to facilitate reproduction and growth," said Dr. Ault.

> "The economic value of tarpon in the U.S. is around $6 billion a year; it's a big deal."

Tarpon appear to be the ultimate nomad, belonging to no one state, country or even continent. Constantly on the move like some finned band of gypsies, they seem to vanish before their secrets are revealed. In fact, it is believed there exist few truly resident tarpon. Certainly the juveniles spend some time in the nursery grounds of the backcountry in the Florida Keys where they are targeted by anglers as "baby tarpon." However, once they reach sexual maturity and roughly 100 pounds, they hit the road.

"We have the huge migrating schools here in the Keys for about six weeks while they're spawning, until about the end of May," said Dr. Ault. "As the water warms, half of the group goes up the East Coast and the other half goes up the Gulf Coast toward the mouth of the Mississippi River." The bulk of the resource will reach the Georgia line by the first of June, North Carolina by mid-July, and Virginia in August, differing slightly by season. They will retreat south again with the first strong cold fronts.

Dr. Ault and his research center have been utilizing Pop-up Archival Transmitting tags, or PAT tags, to track tarpon migrations. Once a tarpon is caught, a PAT tag is attached by a small dart and tethered to the back of the fish. For a period of up to nine months, the tag collects not only the fish's location, but also the water temperature, light level, salinity and the fish's depth in the water. The tag pops off at a predetermined date via a low energy charge that causes it to separate. Consequently, it floats to the surface and uplinks its data, notifying Dr. Ault with an email.

Since the inception of their tagging program in 2001, Dr. Ault and his team have tagged 350 tarpon; including several in North Carolina which were later tracked to the Indian River Lagoon in Florida, coinciding with the silver and black mullet spawn. However, these tireless travelers are turning up in unusual places. Several fish have been traced up to 150 miles into pure freshwater rivers, while others have ventured nearly 400 miles to the east of Cape Cod in the Gulf Stream.

One recurring theme Dr. Ault has discovered through tagging is the fish's propensity to be found along what is known as the 26th degree Celsius Isotherm. An isotherm is basically a line of equal temperature, and 26 degrees Celsius is also 78.8 degrees Fahrenheit. As the ocean water warms and cools, this slug of warm water moves up and down the east coast

of the U.S. and South America. "The tarpon follow this temperature regime as a guideline for their migrations," said Dr. Ault.

Although interest in tarpon fishing is on the rise, the species numbers are not. "The U.S. has changed for the most part to catch and release fishing," said Dr. Ault. "But this is not true farther south." As tarpon venture into the southern end of their range through parts of Mexico and as far south as Brazil, the custom changes to more of a subsistence culture, where the fish are kept without restriction.

"The economic value of tarpon in the U.S. is around $6 billion a year; it's a big deal," said Dr. Ault. However, many cultures see them as just another fish. In fact, it is a bony fish with undesirable meat that is kept in these countries for the consumption of their roe or animal feed. "Our partners to the south are critical; we have to make them understand that these fish they sell in their markets for 10 cents a pound could be worth much more as a recreational fish," he said.

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So how should North Carolina anglers pursue a constantly moving target? According to Capt. Blake, the angler himself must stay on the move. As he said one muggy July day on the Pamlico Sound, "we're going to put at least 50 miles on this boat today."

Fortunate for the seekers, tarpon "gulp" air by way of a swim bladder that acts as a simple lung. They are the only fully marine animals capable of doing so. This is the function of the telltale roll in which a tarpon breaks the surface and reveals its location.

Although tarpon can be spotted from the console or bow of a conventional vessel, many serious anglers affix a tower to their boats, most often with remote steering and throttle. This raises an angler's vantage point up to 10 feet, and unveils disturbances on the water's surface for hundreds of yards on a relatively calm day. Not to mention the glaring flash of a silver beauty catching the sun's reflection.

"You want to see where that fish is going," said Blake, "then set up in front of the school and drift into them." Fishing cut bait is regarded as far and above the most effective strategy for hooking up with tarpon. Blake interchanges between the freshest croaker, spot, mullet and menhaden until he determines what is preferred in that scenario.

"I set up with six rods out from the boat in all directions," said Blake, who dresses all his spinning reels with 50-pound braided line and maintains a tight drag to allow the fish to hook himself during its initial run. "I almost always fish my baits with no weight, but if the fish aren't biting and I know they're close, I will suspend the bait with a balloon," he said.

Once the scene is set for action, anglers feverishly chum the surrounding water with small pieces of baitfish and hope the tarpon pick up the scent. This is also an effective approach when stiff winds produce white caps on the sound and renders sight fishing unprofitable.

In such case, dedicated anglers are reserved to anchoring on oyster beds and hoping tarpon happen by to feed on the wildlife it sustains. Finding the most productive areas is a matter of experience and using sonar.

Years of chasing tarpon give Blake a solid starting point when they are spotted in an area. Thanks to a technological advantage, his best oyster beds are available at a finger's touch, accumulated in his GPS unit. But, knowing your sonar will help you find new beds. "You want to read a really hard bottom," said Blake. "That means you are on solid oysters in the middle of the bed, instead of just scattered oysters on the edges. The center of the bed will also be slightly elevated. If the surrounding area is 21 feet, the middle will be around 19 feet."

Fishing the Pamlico Sound is a daunting task, but the mouth of the Neuse River near the sleepy town of Oriental is one of the best places to start. An estuary is only as productive as its tributaries, and the Neuse is nutrient-rich, attracting the baitfish that draw tarpon. The mouth of the Pamlico River near the vicinity of the Pungo River is another hotspot.

Tarpon are unlikely to ever be thought of with the warm fondness of spunky bluegills or channel cats caught down by a timeless creek before the dawn of our modern age. Rather, their place will be revered amongst piscatorial treasure hunters, men with steadfast resolve and unwavering allegiance. For theirs is the stuff of legend, the silver king himself, the tarpon.

Dusty Wilson is a freelance writer from Angier, making his first appearance in Wildlife in North Carolina.

WILDLIFE *and* AIRPORTS

Although bird species are the primary problems, other animals can damage aircraft and endanger lives.

WRITTEN BY DR. ED BROTAK

Wildlife and airplanes do not mix. Whenever there are encounters, something bad happens. Almost always the bird or animal is killed. Serious damage to the aircraft is unusual but does occur. Rarely a plane is brought down. The famed "Miracle on the Hudson" occurred on Jan. 15, 2009 after US Airways Flight 1549 encountered a flock of Canada geese shortly after takeoff from LaGuardia Airport in New York. Both jet engines ingested enough of the birds to shut down. Captain Chesley "Sully' Sullenberger successfully ditched the powerless plane in the Hudson River and all 155 onboard were saved.

Back in 1995, an Air Force $190 million AWACS plane also encountered geese on takeoff from Elmendorf Air Force Base in Alaska. Unfortunately, this aircraft crashed, killing all 24 crewmembers and destroying the plane.

According to the Federal Aviation Administration (FAA) Serial Report 19 "Wildlife Strikes to Civil Aircraft in the United States 1990–2012" released in September 2013, 60 aircraft were reported as being destroyed by encounters with wildlife in that 22-year period. The annual average damage to aircraft in the U.S. due to wildlife strikes is $957 million. In the 10 years from 2004 through 2013 in the U.S., there have been 72 fatal accidents due to wildlife strikes. In addition, 264

JAROMÍR CHALABALA

incidents resulted in injuries but not deaths. And worldwide since 1988, 250 people have died and 229 aircraft were destroyed due to aircraft collisions with wildlife.

There are actually thousands of wildlife strikes to aircraft reported each year in the U.S. alone. Since 1990, the FAA mandated that all strikes are to be recorded regardless if there is any damage or not. Most of these encounters do not harm the aircraft or those inside. For example in 2012, a record 10,726 strikes were noted but only 606 did any damage and usually it was minor.

North Carolina has always been in the forefront of the wildlife aviation problem.

Of course when we think of airplanes hitting wildlife, we think of birds. And, yes, the vast majority of aircraft strikes are by birds. The FAA report listed 482 different species of birds involved in the collisions, most of them smaller birds. In terms of damage, as one would expect, larger birds are more of a hazard. Of strikes that caused damage to the aircraft, waterfowl led the list, causing 30 percent of the strikes. They were followed by gulls (22 percent), raptors (20 percent), and pigeons/doves (7 percent). The most dangerous (damaging) species include snow geese, black vultures, turkey vultures, Northern pintails and Canada geese. Most bird strikes occur while the aircraft is below 500 feet.

Besides birds, there are other types of wildlife that cause concern for pilots. Bats are a logical problem. These flying mammals do hit planes, but they are too small to really cause damage. You wouldn't think terrestrial beasts would be a problem, but planes have to takeoff and land on runways, and creatures that only walk can be in the wrong place at the wrong time. The FAA study found 42 species of terrestrial mammals and even 11 species of reptiles had incidents with planes in the 22-year study period. Two animals which have been most successful in adapting to man-created habitats, the white-tailed deer and the coyote, head the list of wildlife strikes. Over 1,000 collisions with deer and 400 collisions with coyotes were reported. One of the strangest aircraft strikes occurred at MacDill AFB near Tampa Fla., on Sept. 10, 2013. A G-IV jet belonging to the National Oceanic and Atmospheric Administration hit something on the runway. It turned out to be a fish! The sheepshead was most likely dropped there by a bird that had been eating it.

What about here in North Carolina? From 2004–2013, there have been 1,430 reported wildlife strikes on aircraft. Only 20 of these resulted in substantial damage to the aircraft. Of these, three involved deer and the others were mostly larger birds such as hawks and vultures. In all for ground-dwelling animals, there were nine strikes on white-tailed deer, eight strikes on coyotes, two on skunks, two on Eastern cottontail rabbits, two on common snapping turtles, one on a red fox, and one on a possum.

In that 10-year period, only one aircraft was reported as being totally destroyed by a wildlife strike. It hit a rabbit! On March 13, 2006, a small homebuilt aircraft was landing at Miller Air Park Airport near Mooresville. The pilot felt the plane hit something upon landing. As the plane continued along the grass runway, the nose gear began to collapse. The nose of the plane went down, finally hitting the ground. The plane then flipped over. The pilot scrambled out, only suffering a cut to his head. He discovered the remains of a cottontail rabbit.

The problem of wildlife strikes on aircraft is increasing in the U.S. It's also increasing in North Carolina. In 2004, only 82 strikes were recorded in our state. By 2013, that number had increased to 243 strikes. Not only has there been an increase in air traffic but also there has been an increase in bird and other wildlife populations.

With the threat of wildlife strikes on aircraft being a very real safety issue, both the FAA and the U.S. Department of Agriculture Animal and Plant Health Inspection Service-Wildlife Services (USDA WS) have gotten involved. It's the FAA that maintains the official Wildlife Strike Database (which is available to the public at wildlife.faa.gov/database.aspx). The FAA requires all wildlife strikes on aircraft to be recorded even when there is no effect on the aircraft itself. The species encountered is also noted if identifiable. If just unidentifiable remains of a bird or animal are left on an aircraft, feathers or blood/tissue samples can be sent to the Smithsonian Institute's Feather Identification Lab. Here experts can determine the type of bird or animal involved. The problem is so acute that the FAA has addressed the issue of wildlife strikes in its Airport Certification process under Wildlife Hazard Management at Airports. Wildlife control strategies are explained.

The USDA WS also has an Airport Wildlife Hazards Program and provides direct assistance to airports across the country. The National Wildlife Research Center (NWRC) Ohio field station works to develop management strategies to reduce wildlife hazards to aircraft and produce science-based recommendations, policies and procedures to control hazardous wildlife on airports and other locations where they present a hazard to aviation safety.

There is also the Bird Strike Committee-USA. This volunteer organization was formed in 1991 to promote the collection of data on wildlife strikes, facilitate the exchange of this information between interested parties, and promote the development of systems to reduce the hazard. They have representatives from

the FAA, the USDA, the Department of Defense, the aviation industry, and airports. They hold regular conferences to exchange ideas and also work closely with a similar group in Canada.

North Carolina has always been in the forefront of the wildlife aviation problem. One major incident that propelled this safety initiative occurred on Dec. 13, 2002 at the Charlotte Douglas International Airport. After landing, a Piedmont Airlines DHC-8 ran into a white-tailed deer on the runway. Damage to the nose gear, which collapsed after impact, and the fuselage was $225,000.

In 2004, the Department of Transportation's Division of Aviation created a statewide initiative to minimize wildlife hazards, the first in the country. This division, along with the USDA WS, works with airports across the state to reduce wildlife risks. It is funded totally by the state. All 72 of the public airports across the state are included. To start, the USDA WS conducted wildlife hazard site visits to many of the airports. After determining the wildlife hazard, the USDA WS would send a written report to each airport detailing what species were seen on or near airport property, the hazards wildlife pose to airport operations, and finally steps that could be taken to lessen the wildlife threat. In addition to the onsite visits, general training sessions are held at various airport locations around the state and the training is free of charge. In five years, over 600 airport personnel have been trained in wildlife management techniques. There have also been more than 100 direct management projects at 24 different airports involving white-tailed deer, Canada geese, coyotes, vultures and other animals.

What can airports do to minimize wildlife risks? One of the best methods to keep birds and other wildlife away from airports is to make the area less hospitable to them, i.e. habitat removal. Taking down stands of trees, draining ponds and keeping the grass mowed short (the FAA recommends a height of 6–14 inches) help. Remaining ponds can be covered to prevent waterfowl usage. If not fully covered, ponds can be crisscrossed with fishing line to prevent waterfowl landings. In some cases, resident populations of birds such as geese can be relocated. For terrestrial creatures, a perimeter fence is essential but not foolproof.

Many of the larger airports have one person who is in charge of wildlife management, a wildlife biologist or wildlife coordinator or manager. It is that person's job to implement the control measures laid out in the plan. Often they can be found patrolling the grounds of the airport. The perimeter fencing is constantly inspected to check its integrity and to note any signs of wildlife entrance. They are also looking for birds or animals that may pose a hazard. They carry firecracker-like projectiles that can be used to scare off birds.

There are private companies, like Loomacres Wildlife Management, which has been approved by the FAA to provide wildlife management consulting and to help implement the FAA's Wildlife Hazard Management program. There are also companies that provide avian radar systems, radar sets which are specifically designed to detect and monitor birds in flight. They are designed to give warnings of potential bird-aircraft strikes.

With birds being the primary concern, a variety of techniques have been employed at various airports. One of the more controversial is killing the birds. This is rarely done, since it is estimated that about 90 percent of all bird strikes in the U.S. are by species federally protected under the Migratory Bird Treaty Act. Catching birds alive and relocating them is more involved but has been done successfully with some birds of prey. A novel approach is using trained raptors to fly around and scare away other birds. A more typical variation on this is using dogs.

Wildlife strikes on aircraft are the only official statistic kept in regards to this problem. But how many strikes are prevented by the various mitigation efforts? There is no way of knowing for sure. Occasionally this can even become a dangerous job. On May 31, 2011, a black bear was shot at the PTI Airport in Greensboro. The bear had apparently climbed the perimeter fence and was seen on an auxiliary runway. When approached by airport personnel, the bear appeared threatening and was killed.

Dr. Ed Brotak is a retired professor of meteorology at UNC Asheville.

TOSH BROWN

AT PLAY WITH THE GIANTS

When summer rolls around, big red drum find a home in the Pamlico Sound

Written by Beau Beasley

From the bow of the boat, the faint clicking sound grew louder. I was fishing in the Pamlico Sound off the southeastern tip of North Carolina in the blazing sun. Sweat trickled down my back. Unruffled by even a breath of wind, the estuary stretched out before me like a sheet of glass—and yet, there they were again: a few tiny dimples on the water's surface and that curious clicking sound. It couldn't be rain; I readjusted my sunglasses as I peered at the cloudless sky. I gazed at the water again just as the surface erupted in dimples and clicks filled the air. Something was pushing thousands of tiny baitfish to the water's surface; as they cleaved it, their tails make a clicking sound and caused dimples to mar the otherwise dead calm. What were the baitfish trying so desperately to escape?

"It's about to happen, folks," narrated Captain Gary Dubiel of Spec Fever Guide Service to no one in particular. Known throughout the mid-Atlantic, Captain Gary is on the pro-staff of Temple Fork Outfitters, Columbia, and Dead on Arrival (DOA) baits, and has guided clients as far afield as Scotland and Poland. He's been featured on television programs both here and abroad, but his easy-going manner and Southern charm put even the most nervous angler at ease.

"It's about to happen," he repeated with excitement. "I can feel it." I shot a glance at Captain Gary's wife Michelle, who enjoys fishing nearly as much as her husband and joined us at the last minute to make the perfect addition to our fishing party. She smiled in response and gave me a thumbs-up. Our quarry was giant red drum—a fish that most anglers dream about but rarely get a chance to land. These hard fighters push your gear to the limits, make your reel scream, and stretch your

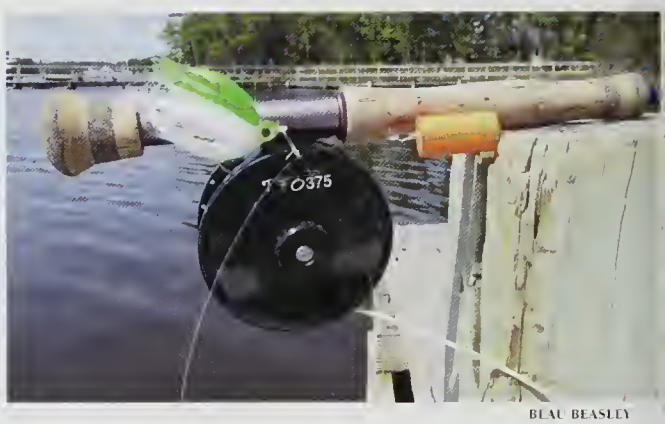
fishing line so tight that it looks like a guitar string about to snap.

If you're looking for fast and furious, look elsewhere. Fishing for giant red drum isn't like the action of a bluefish blitz or what happens when you stumble upon a band of marauding schoolie stripers chasing bait. Instead, this style of fishing is more akin to the deer hunter silently waiting for that trophy buck: Patience and skill are the names of this game. Why bother? Well, just one of these beasts might be the catch of a lifetime.

I cast my rod and began my retrieve, looking out over the calm waters of the Pamlico Sound. As I made another cast I heard a splash that sounded like someone had thrown a cinderblock over the side of the boat. The surface of the water bent in the ripples of an enormous swirl, and Michelle Dubiel's rod was poised to dive to the bottom of the Sound. She winked at me and said cheerfully, "I think I might have a bite."

Michelle made sure that the hook was set—and then handed her rod to me. "Here you go, Beau! We catch these things all the time. You really can't appreciate how hard they pull until you have to fight one yourself." Dazed with disbelief, I took the rod from her and gripped the handle firmly. The behemoth on the other end of the line apparently wasn't impressed with my masterful handling: The reel screamed louder than ever as the line spun out into the Sound. When the fish reached the limits of my line ... would I head overboard with him?

BEAU BEASLEY



BEAU BEASLEY

Left, Capt. Gary Dubiel displays a big red drum before releasing it. Top, in shallow water, red drum feed head down on the bottom and anglers stalk the tailing fish. Above, While common on conventional tackle, Dubiel also uses poppers on his fly tackle.

UNCONVENTIONAL WISDOM

Captain Gary stalks these brutes like he's big-game hunting. He stakes out a likely looking spot, calls in his quarry and dukes it out on level ground. "When I first moved here several years ago, I was told that these big drum were here but that you could only catch them at night. Then I was told you could only catch them with cut bait. It turns out that neither is true."

One day Captain Gary and his client landed a large drum in full sun on a plug-type rig. The same thing happened to him later in the season—and then he had a "light bulb" moment: "It occurred to me that these large drum might be responding to the sounds of what they think are breaking baitfish. These big drum travel together and they hate the thought of someone else getting an easy meal and them missing out. Despite conventional wisdom and what I'd been told by local anglers for years, I surmised that I could not only use artificial bait, which reduces pressure on baitfish like menhaden, but that I could do it in the daytime." Captain Gary's theory paid off, and he's nearly single-handedly revolutionized this style of fishing. Almost every other boat I saw in the marina where we launched had a setup based on Captain Gary's popping cork method of fishing.

THE POPPING CORK

The conventional setup for this style of fishing requires a medium-heavy action spinning rod. Captain Gary and I used an inshore series 7-foot Temple Fork Outfitters rod paired with a Penn SSV 4500 spinning reel with a 30-pound Suffix 832 braid. We then used 18 inches of 30-pound leader connected by a double uni-knot. The Popping Cork setup is generally around 20 inches of 50- to 60-pound leader tied to a ¼-ounce Dead on Arrival (DOA) jig head with a DOA Airhead or 5.5-inch jerk bait. Productive colors include Key Lime, Pink Glow, Gold Rush, Pearl and Green Back. He places a cupped face foam cork about 18 inches to 2 feet above the jerk bait. When the angler retrieves his rig, he generates a popping sound, which causes the drum to investigate. As the angler takes a slight pause between retrieves, the bait seems

TOSH BROWN

to be fleeing or darting near the surface of the water, and this entices a vicious strike.

I'm pleased to report that fly anglers can get in on the action—though they have tougher casting ahead than do conventional anglers. Use a 9- or 10-weight fly rod along with a matching floating fly line. Large arbor reels with a significant drag are a must to land these fish. Fly anglers will use a setup similar to the conventional setup I mentioned, but with 3/0 flies that mimic baitfish: Consider Dubiel's Fish Caller popper and Little Haden fly, which appear as stunned or injured baitfish when retrieved with a pause.

This isn't dainty fishing, so leave the subtleties to the guys fishing for brook trout. Anglers have to move the cork aggressively across the water's surface if they hope to accurately mimic surface-feeding baitfish and attract giant red drum. Prime time for this fishery runs from mid- to late July and may run all the way through September (and on really good years, into early October). To better your odds of landing one or more of these beasts, book a multi-day trip. Sometimes the fish are really active; other times you have to scout for them. The occasional storm can also scatter the baitfish, which makes nailing down your prey much more difficult.

A TUG OF WAR

I was locked in a tug-of-war with the fish, and I was not at all convinced that I was going to emerge the victor. "Pretty good fight, huh, Beau?" Michelle said with a grin. I tried to smile back but managed little more than a grimace as the Battle for the Rod continued.

I would gain a few feet and begin to make headway before the fish would take off again, peeling off several dozen yards of line at a time. "Hey, Beau—we haven't got all day," teased Captain Gary. "I wish you'd quit messing around and land that fish. I had a nice lunch planned for us!" I turned to tell him that I had the beast whipped when the fish tore off again from the boat at an alarming speed.

Eventually I brought to hand the largest fish I've ever landed—a beautiful bronze and copper-colored drum that left me panting with exhaustion and struggling just to hold him up to snap a few photos. The beast might have been 25 years old and possibly older. (The only way to determine its age with accuracy would have been to examine the otoliths, or "ear bones," inside its head.) I gazed upon him in awe and knew that I was holding on to a piece of living history. I gently released my prize back into the sound, but I felt certain that I'd been hooked just as surely as the drum had. I knew that I'd be back again someday to play among the giants of the Pamlico Sound. ◆

Beau Beasley (beaubeasley.com) is the author of "Fly Fishing the Mid-Atlantic" and the Director of the Virginia Fly Fishing & Wine Festival.

IF YOU GO

Oriental, North Carolina, serves as the perfect base of operations for your giant red drum fishing trip. This hamlet boasts local shops and good restaurants, all within easy walking distance of the Oriental Marina. In fact you could stay at the marina—where you get the added benefit of the best view in town—and simply walk down to the dock; hop on Captain Gary's boat in the morning, and he'll drop you off at the end of the day. Doesn't get much easier than that.

Oriental also has plenty to offer the non-angler in your group. Shops are easy to reach from the marina, and a local coffeehouse (which also features ice cream) is the perfect place to relax with a good book. When you finish your coffee, head out to explore the independent shops and boutiques lining the streets. You might even consider a day trip to nearby coastal towns and other local attractions from your perch in convenient, charming Oriental.

Captain Gary Dubiel
Spec Fever Guide Service
specfever.com
252-249-1520

Oriental Marina and Inn
orientalmarina.com
252-249-1818

River Neuse Suites
riverneuserentals.com
252-249-1404

Large and Colorful; these are the

Silk Moths

written by Buffy Silverman / illustrated by Amelia Hansen
nature activity by Anne M. Runyon

A giant polyphemus moth rests on an oak tree with its wings folded. Its dark body hangs from a twig, barely visible in the evening light. With only the undersides of its wings showing, the moth looks like a dried leaf.

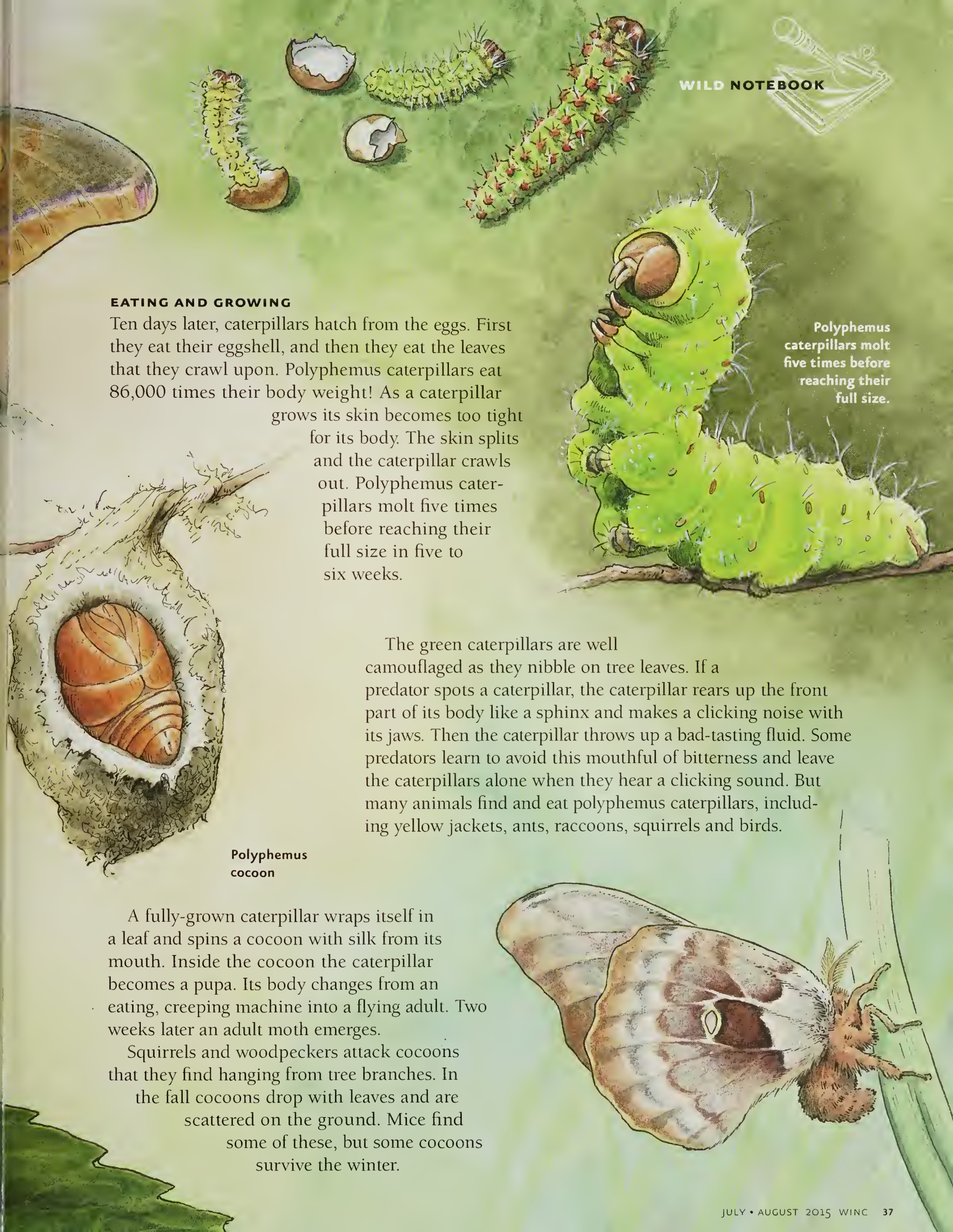
A hungry crow lands on the oak tree and hops closer and closer to the moth. Suddenly the moth spreads its huge wings open, flashing two large spots on its hind wings and two small spots on its front wings. These colorful spots startle the crow. The crow flaps his wings and whisks away. The polyphemus moth remains on the tree, unharmed by the still-hungry crow.

HIDDEN GIANT

When its wings are open a polyphemus moth is about the size of your hand. Like most moths, its body is fat and fuzzy. But the well-camouflaged giant is difficult to spot. It spends the daylight hours hidden on tree trunks and branches.

At night the huge adult moths are active, looking for mates and laying eggs. A female polyphemus moth gives off a chemical signal called a pheromone. With its feathery antennae, a male can detect the scent of her pheromones from a mile away. He follows the scent trail until he finds the female and the pair mate.

After mating a female lays her eggs on the underside of tree leaves. For the next few nights she lays eggs in groups of two or three. While polyphemus caterpillars munch leaf after leaf, the adult moths do not eat at all. Within four days of becoming an adult the moth dies.



EATING AND GROWING

Ten days later, caterpillars hatch from the eggs. First they eat their eggshell, and then they eat the leaves that they crawl upon. Polyphemus caterpillars eat 86,000 times their body weight! As a caterpillar grows its skin becomes too tight for its body. The skin splits and the caterpillar crawls out. Polyphemus caterpillars molt five times before reaching their full size in five to six weeks.

Polyphemus caterpillars molt five times before reaching their full size.

The green caterpillars are well camouflaged as they nibble on tree leaves. If a predator spots a caterpillar, the caterpillar rears up the front part of its body like a sphinx and makes a clicking noise with its jaws. Then the caterpillar throws up a bad-tasting fluid. Some predators learn to avoid this mouthful of bitterness and leave the caterpillars alone when they hear a clicking sound. But many animals find and eat polyphemus caterpillars, including yellow jackets, ants, raccoons, squirrels and birds.

Polyphemus cocoon

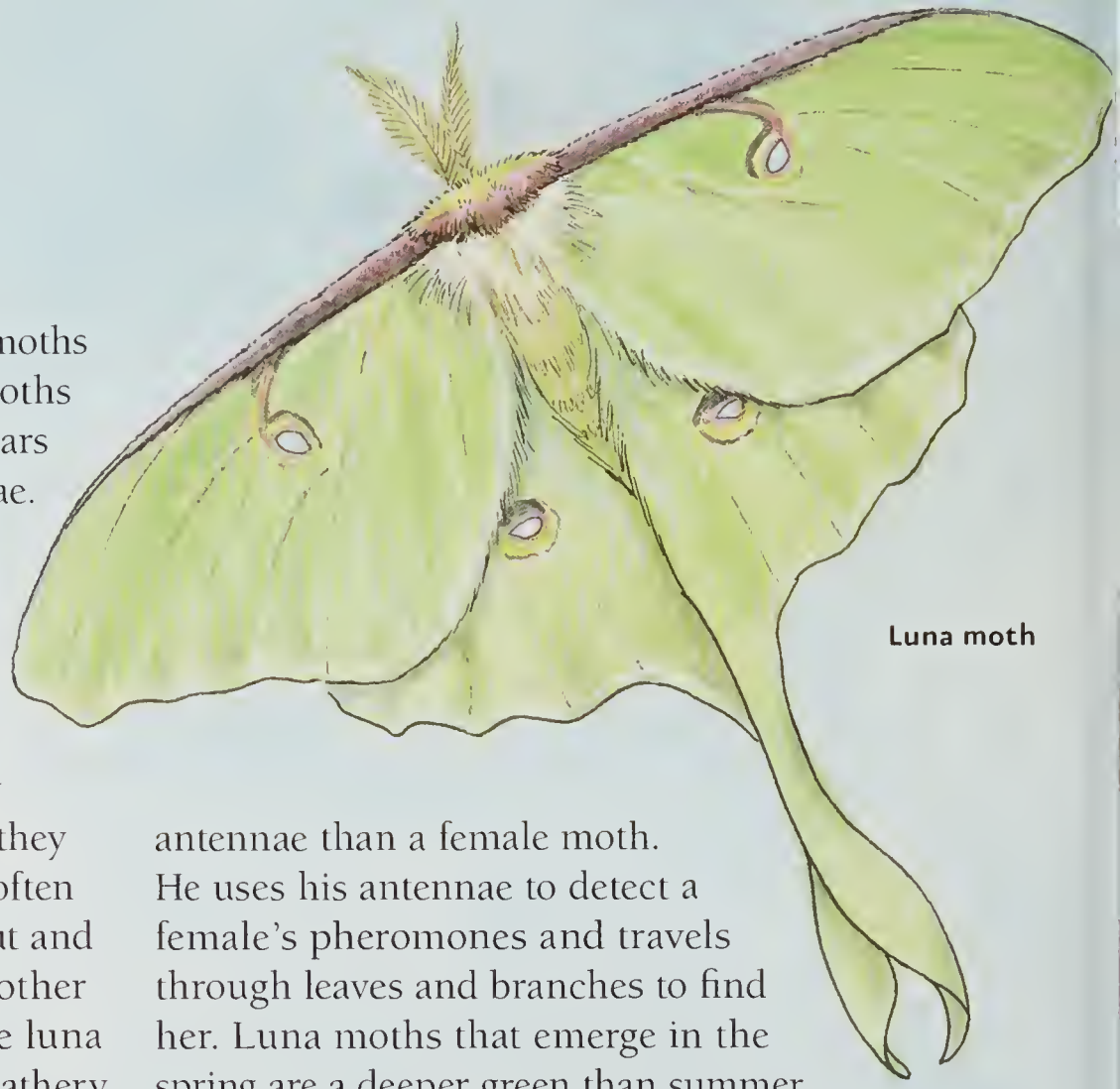
A fully-grown caterpillar wraps itself in a leaf and spins a cocoon with silk from its mouth. Inside the cocoon the caterpillar becomes a pupa. Its body changes from an eating, creeping machine into a flying adult. Two weeks later an adult moth emerges.

Squirrels and woodpeckers attack cocoons that they find hanging from tree branches. In the fall cocoons drop with leaves and are scattered on the ground. Mice find some of these, but some cocoons survive the winter.

COLORFUL SILK MOTHS

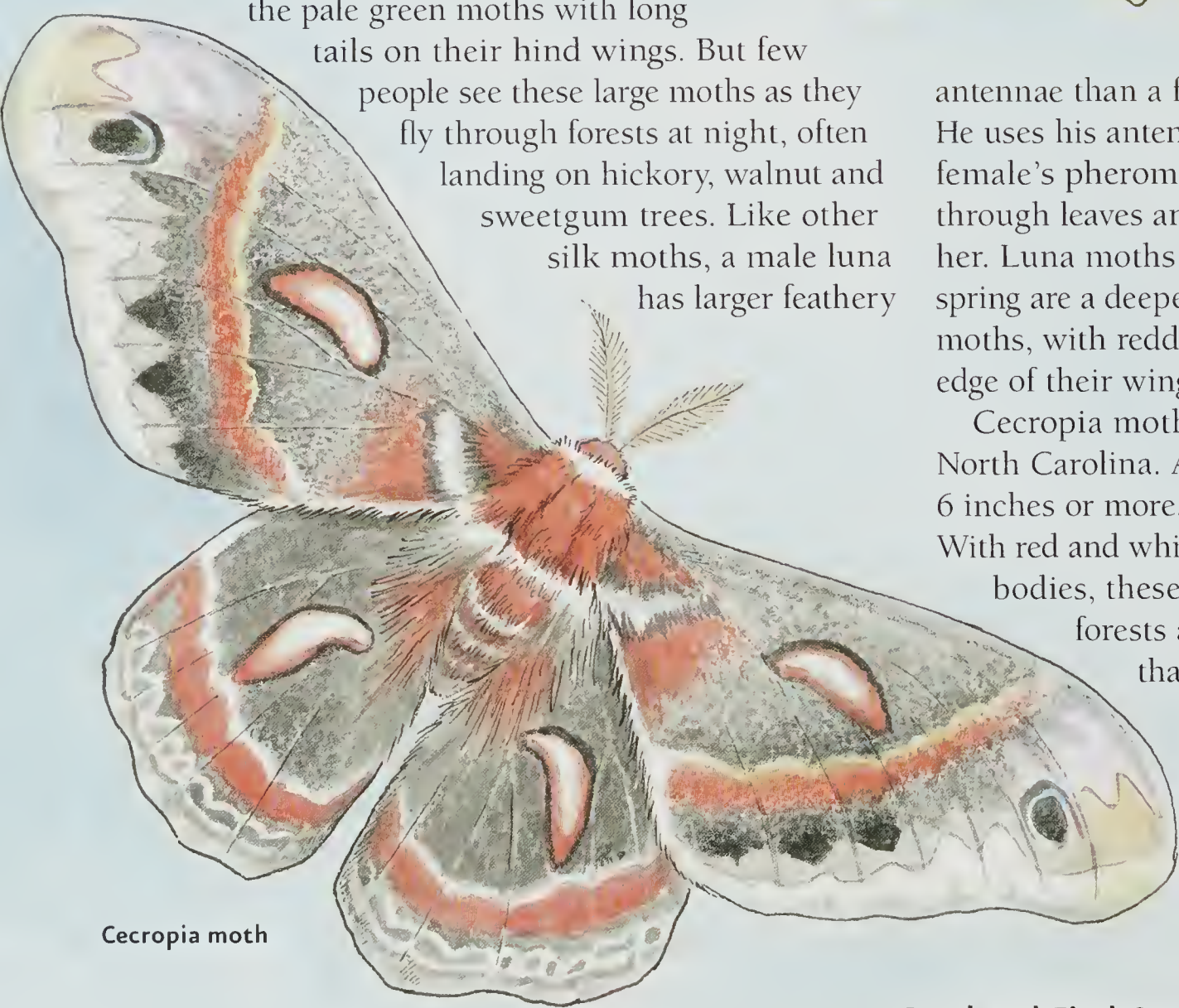
Polyphemus are one of nine different kinds of silk moths in North Carolina. All of these night-flying silk moths are large and colorful. They have voracious caterpillars that spin silken cocoons before changing into pupae. The adult moths that break out of the cocoons cannot eat, and live for only a few days.

Many people think the luna moth is one of our most beautiful silk moths. It's easy to recognize the pale green moths with long tails on their hind wings. But few people see these large moths as they fly through forests at night, often landing on hickory, walnut and sweetgum trees. Like other silk moths, a male luna has larger feathery antennae than a female moth. He uses his antennae to detect a female's pheromones and travels through leaves and branches to find her. Luna moths that emerge in the spring are a deeper green than summer moths, with reddish-purple along the edge of their wings.



Luna moth

Cecropia moths are the largest native moths in North Carolina. A female cecropia's wings can stretch 6 inches or more. The male moths are slightly smaller. With red and white bands on their wings and red fuzzy bodies, these spectacular silk moths flit through forests at night. Some male cecropia moths that follow a scent trail get an unpleasant surprise. Bola spiders lure in a meal by making a chemical that mimics the smell of a female cecropia's pheromones. If a male cecropia comes too close, he becomes the bola spider's dinner!



Cecropia moth

Get Outside

You can find silk moths and other night-flying moths by attracting them to your yard. Moths are attracted to lights. Leave a porch light on after dark, and go outside to observe what moths land on a wall near the light. Or try hanging a white sheet on a clothesline and shine a light on it. The moths that hang on the sheet are easy to observe on a light background.

No one is sure why moths fly to lights. Some scientists think that moths may use the moon as a distant light source that helps them navigate as they fly. An artificial light confuses moths, so they fly in circles around it or land nearby. Be sure to turn off your light after observing moths so that the moths can continue on their journey.

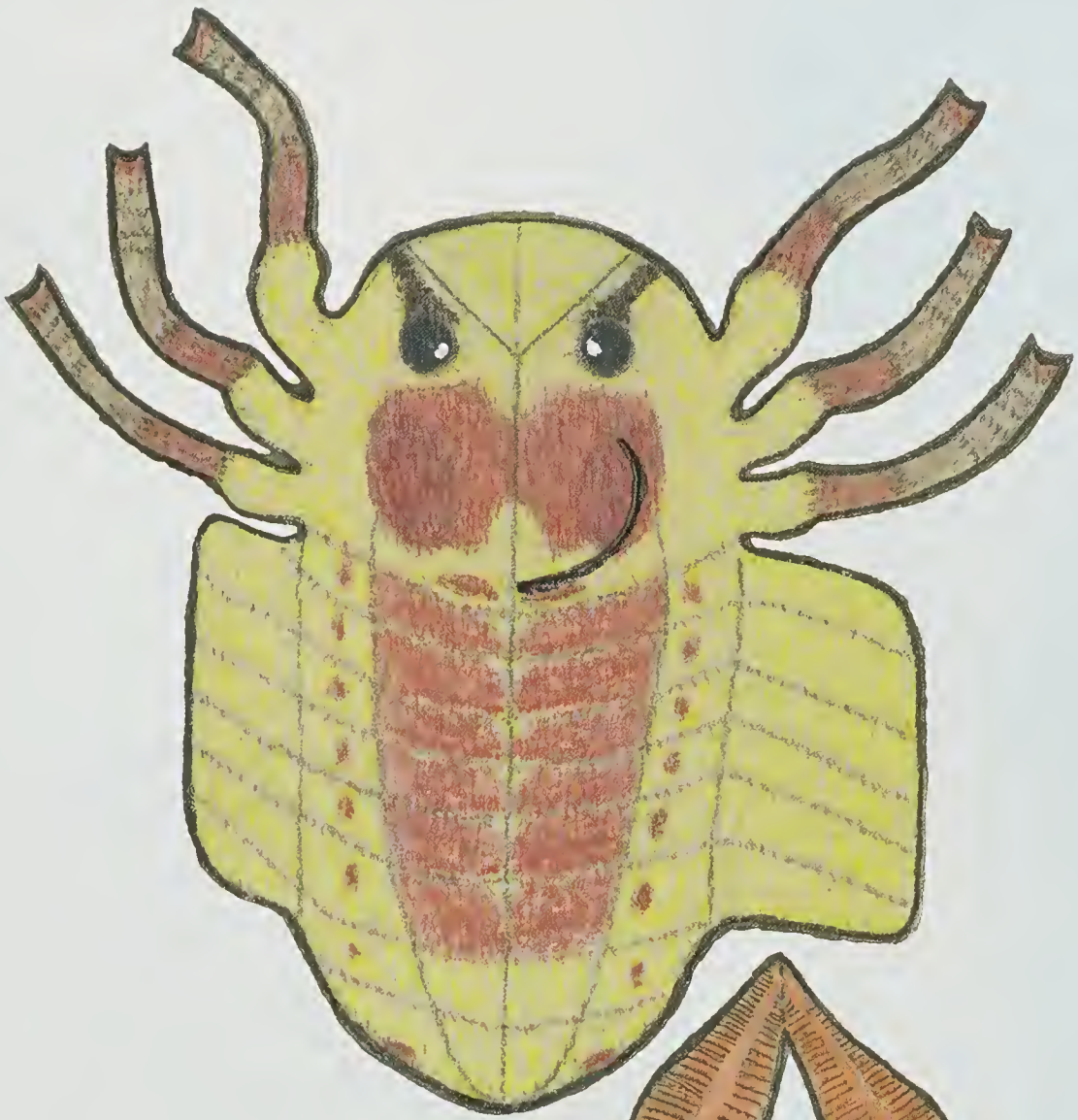
Read and Find Out

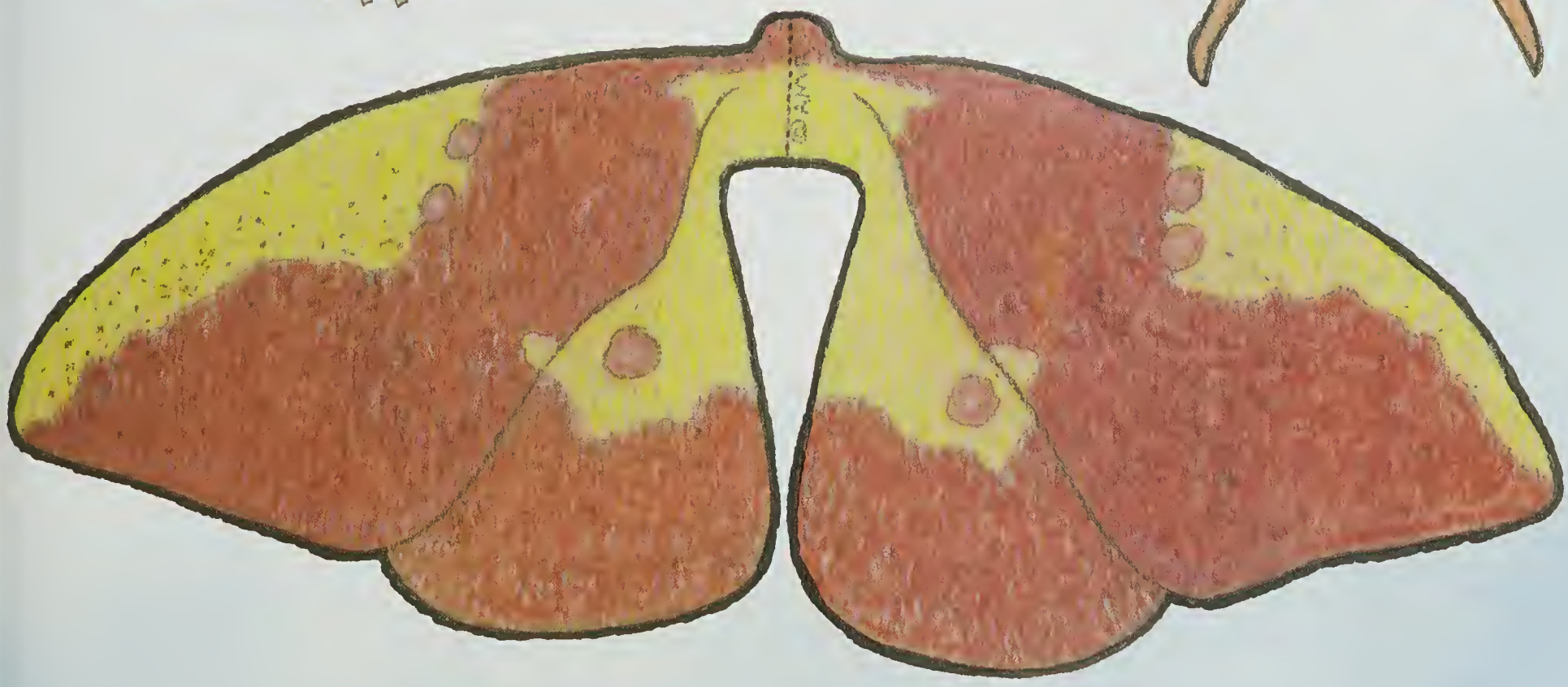
- "A Luna Moth's Life" by John Himmelman, Children's Press, 1998.
- "Can You Tell a butterfly from a Moth?" by Buffy Silverman, Lerner Publishing, 2012.
- "Discovering Moths: Nighttime Jewels in Your Own Backyard" by John Himmelman, Down East Books, 2002.
- "DK Eyewitness Books: Butterfly and Moth" by Paul Whalley, DK Publishing, 2012.
- "Luna Moths: Master of Change" by Sandra Markle, Lerner Publishing, 2008.
- "Peterson First Guides: Butterflies and Moths" by Paul A. Opler, Houghton Mifflin Co., 1994.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's website at ncwildlife.org.

Imperial Moth Paper Sculpture

1) Copy design on sturdy paper. 67lb cover stock works well.
2) Cut out wing, antennae and body designs.
3) Fold body in half along center line. Cut open wing slit on back, following black line. Unfold.
4) Sculpt body. Fold abdomen (hind end of moth) by pinching along the four slightly curving lines. Unfold.
5) Insert wings into wing slot and glue or tape to secure wings. Fold body in half again. Unfold.
6) Fold antennae in half. Set aside.
7) Sculpt head. Pinch down along the two lines in front of eyes, pushing center line into a valley fold.
8) Add glue to valley fold, insert antennae and glue shut. Then glue this fold to underside of head.
9) Turn moth upside down and glue short flap over larger flap to finish abdomen.
10) Spread legs out. Open and curl antennae a little. Ease hind wing up a bit to finish your Imperial moth paper sculpture.





Winners Crowned in Youth Hunter Education Tournament

Forbush High School and Park Ridge Christian School teams emerged as champions at the 2015 Youth Hunter Education Skills Tournament held April 27 in Ellerbe. The N.C. Wildlife Resources Commission held the pre-collegiate sports state championship at Millstone 4-H Center in Richmond County for youth to showcase their outdoor skills and demonstrate safety techniques they learned through the Hunter Education Program.

Youth competed in team and individual categories for rifle, shotgun, archery and orienteering on senior (high school) and junior (middle and elementary schools) divisional levels, with overall team and individual awards based on aggregate scores in all events. Forbush High, of Yadkin County, won the senior division with an overall score of 3,828 out of a possible 4,000, while Park Ridge Christian, of Stanly County, won the junior division with an overall score of 3,727.

There were 599 students from 61 teams participating in this year's tournament, having advanced from nine district events across the state. Total attendance, including spectators, staff and competitors at the tournament was estimated at 2,100.

"These competitors are a great reflection of conservation, and exemplary in their skills and commitment," said Travis Casper, the state hunting education coordinator and tournament director. "Rain didn't dampen enthusiasm or scores, and other than the inclement weather, the tournament was a success. I can't thank the volunteers and staff enough for their hard work."

The Fred Rorrer Trophy, which recognizes sportsmanship among competitors, was presented to the Elkin High School team. The trophy honors its namesake, a longtime hunting education instructor with the Wildlife Commission who died unexpectedly in October 2010. Rorrer is remembered for his dedication to conservation and leadership in the youth tournaments, where he helped bolster North Carolina teams and individuals to the top levels of national competition.

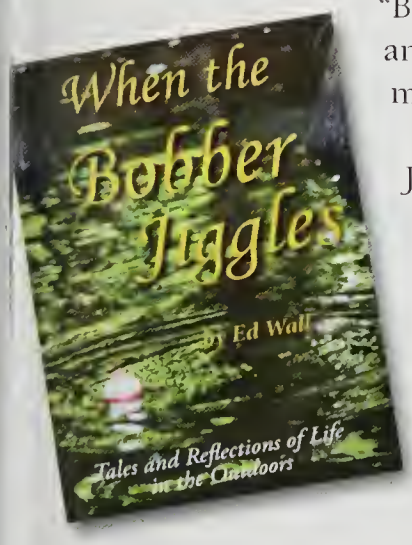
Teams are organized within public and private schools, as well as home-schooled students and teams representing organizations such as 4-H or Future Farmers of America. Nine district tournaments, held in March, saw participation by more than 3,000 students from 311 schools. For more information, call 919-707-0031.

Forbush High (above) won the team title in the senior division, while Park Ridge Christian took the junior title.

New Bern Writer Pens New Book

Cane poles and coffee cans full of red worms; early morning in a hunting camp with gentle rain drumming on the tin roof; a bird dog floating ghost-like through a stand of longleaf pines; tales and saddle sores, missteps and milestones you love to recall. Those and other topics comprise "When the Bobber Jiggles," a new collection of tales and reflections of life in the outdoors by award-winning author, Ed Wall.

Reading "When the Bobber Jiggles" is akin to sitting by a campfire with an old friend recollecting how things used to be and ought to be, and, on occasion, stretching the veracity of a story to the breaking point. "Hunting with Henry," "Bear Hunting's 'Other' Challenges," "Old Fishermen May Be an Endangered Species"—these are a few of the chapters that make up the 142-page, soft-bound book.



Published by River City Publishers, "When the Bobber Jiggles" is written in a format that allows the reader to enjoy a chapter or two, put it aside, then pick it back up and not miss a beat. Copies (personalized if requested) are available for $12.95 (plus $3 shipping and handling if mailed) from the author at 3045 Red Fox Rd., New Bern, NC 28562. Ed Wall can be contacted for more information or special orders at 252-671-3207 or by email at edwall@embarqmail.com.

In July and August, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through February 28, 2016.

Crow: Through July 31—Wednesday, Friday and Saturday plus Independence Day.

There is no closed season or bag limit for groundhog, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the latest *North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit ncwildlife.org.

Commission Biologist Honored For CURE Work

The N.C. Wildlife Resources Commission and an agency biologist were honored recently by the Hugh Hammond Bennett Chapter of the Soil and Water Conservation Society for development of state-of-the-art wildlife habitat practices.

The Natural Resource Enhancement award, recognizing innovation and practical application of conservation techniques, was presented to Benjy Strope, a technical assistance biologist responsible for the Wildlife Commission's corporate component of the Cooperative Upland Habitat Restoration and Enhancement (CURE) Program. The Corporate CURE program works with hog farms in Bladen, Sampson and Duplin counties to manage habitat for small game, quail and other high priority non-game wildlife species with a focus on improving water quality.

"Something with the scope of the Corporate CURE program, with so many facets, requires someone who sees the breadth and scope of projects and then puts in the man-hours to bring it to realization," said Dawn Williamson, chapter president. "That person is Benjy Strope, who has daily accomplishments. He writes the grants, he tests the water, he makes the site visits, and he turns concepts into reality."

The Soil and Water Conservation Society is an international nonprofit scientific and educational organization that fosters the science and art of soil, water and related natural resource management to achieve sustainability. The Hugh Hammond Bennett Chapter represents North Carolina and is celebrating its 50th year.

The Unit of Government award was presented to the Wildlife Commission for its long-term efforts and success of the Corporate CURE program. Corporate CURE, established in 2004, has been one of the most successful components of the overall CURE program. CURE was established by the commission in 2000 to encourage farmers, ranchers and forest owners to manage early-successional habitats that benefit a wide range of small game and high priority non-game wildlife species. Go to ncwildlife.org/CURE for more information.

NCWRC biologist Benjy Strope received an award for his work with the corporate CURE program.

CALENDAR OF EVENTS

Saturday, July 11

Don't miss the 52nd Annual Coon Dog Day in Saluda. It's a celebration for dogs and their people. Expect great food, live music, parade, crafts, street dance, and more. Visit Saluda.com for information.

July (many dates)

With the opening of dove season just two months away, it's time to get those new hunters-to-be enrolled in a Hunter Education Program course. More than a firearm safety course, instruction includes ethics and responsibility, conservation and wildlife management and more. This 10-hour minimum course is required for all first-time hunting license purchasers. These free classes often fill up so go to ncwildlife.org/Hunting.aspx to learn more and to register.

July and August (many dates)

The N.C. Wildlife Resources Commission is offering free outdoor recreational classes this summer through its Centennial Campus Center for Wildlife Education in Raleigh. The classes are open to the public but have some age restrictions, and require pre-registration on a first-come, first-served basis. To learn more visit ncwildlife.org/Learning.aspx.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to mike.zlotnicki@ncwildlife.org, or call 919-707-0175.

LIFETIME LICENSES

Help conserve wildlife for future generations. In 1981, hunters, anglers and wildlife enthusiasts became shareholders in an innovative investment and conservation program called the North Carolina Wildlife Endowment Fund.

Today, the commission has 19 different lifetime licenses in five categories: Infant, Youth, Adult, Senior and Disabled.

The endowment fund for wildlife was a simple yet revolutionary idea: Create a lifetime inland fishing or hunting license. Put the license fees into a special fund. Spend the accrued interest, not the principal, on programs and projects that benefit fish and wildlife. To learn more or to purchase a lifetime license visit ncwildlife.org/licensing or call 1-888-248-6834.

First Gobbler Took a While

Dan Justice of Wilmington harvested his first gobbler on opening day this past season. It was only 93 years in the making. Justice was hunting with his grandson, Jeremy Owens, 36, of Wrightsville Beach, and overcame several obstacles to take the bird.

"I picked him up at 2 p.m. and drove right up to the blind," said Owens, who works as a fireman in Carolina Beach and as a part-time stuntman. "We were able to drive right up to the ground blind."

One of Owens stunt jobs is the Headless Horseman on Fox's "Sleepy Hollow."

Justice uses a walker, so easy access to the half-acre chufa plot was essential. Owens put out a jake and a hen decoy and started with some light calling. Soon some hens appeared and pecked the hen decoy. Then, a gobbler came and attacked the jake decoy.

"He came running in like he was in some kind of a race," said Justice. "He jumped on the decoy with both feet. I enjoyed watching him beat the turkey decoy down."

The first time Justice attempted to shoot the tom the gun malfunctioned, but Owens was able to re-chamber the shell without spooking the bird. The second attempt was good and Justice harvested the gobbler, which sported a 10.75-inch beard and 1.25-inch spurs.

"I've been hunting with Jeremy since he was 14," said Justice. "It couldn't have been a more perfect day. To be there with my grandson is just a blessing from heaven."

Boating Access Area Reopened

The N.C. Wildlife Resources Commission has re-opened the Turkey Creek Boating Access Area in Onslow County after completing renovations.

The boating access area, which is located at 619 Turkey Point Road in Holly Ridge, provides access to the Intracoastal Waterway where anglers can catch speckled sea trout, redfish and flounder. GPS coordinates are: 34°29' 39" N, 77° 27' 55" W.

Wildlife Commission staff replaced the original ramps and docks, which were more than 30 years old, with a new two-lane concrete ramp and a 60-foot x 8-foot floating dock. Staff also constructed vinyl walls on each side of the ramp.

The commission plans to pave the parking lot for 11 trailer spaces and two single-vehicle spaces. After the parking lot is paved, the site will be ADA accessible.

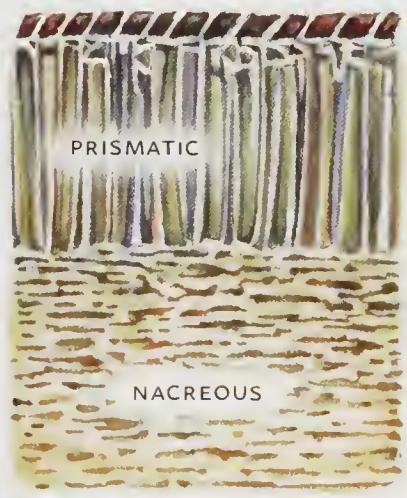
The Commission paid for the renovation of the Turkey Creek Boating Access Area using money from motorboat registration receipts as well as a coastal recreational fishing license grant from the N.C. Division of Marine Fisheries.

For more information on boating in North Carolina, including the locations of more than 200 free, publicly accessible boating access areas, visit ncwildlife.org/Boating/WheretoBoat. For more information on fishing in North Carolina, including where to fish, visit ncwildlife.org/fishing.

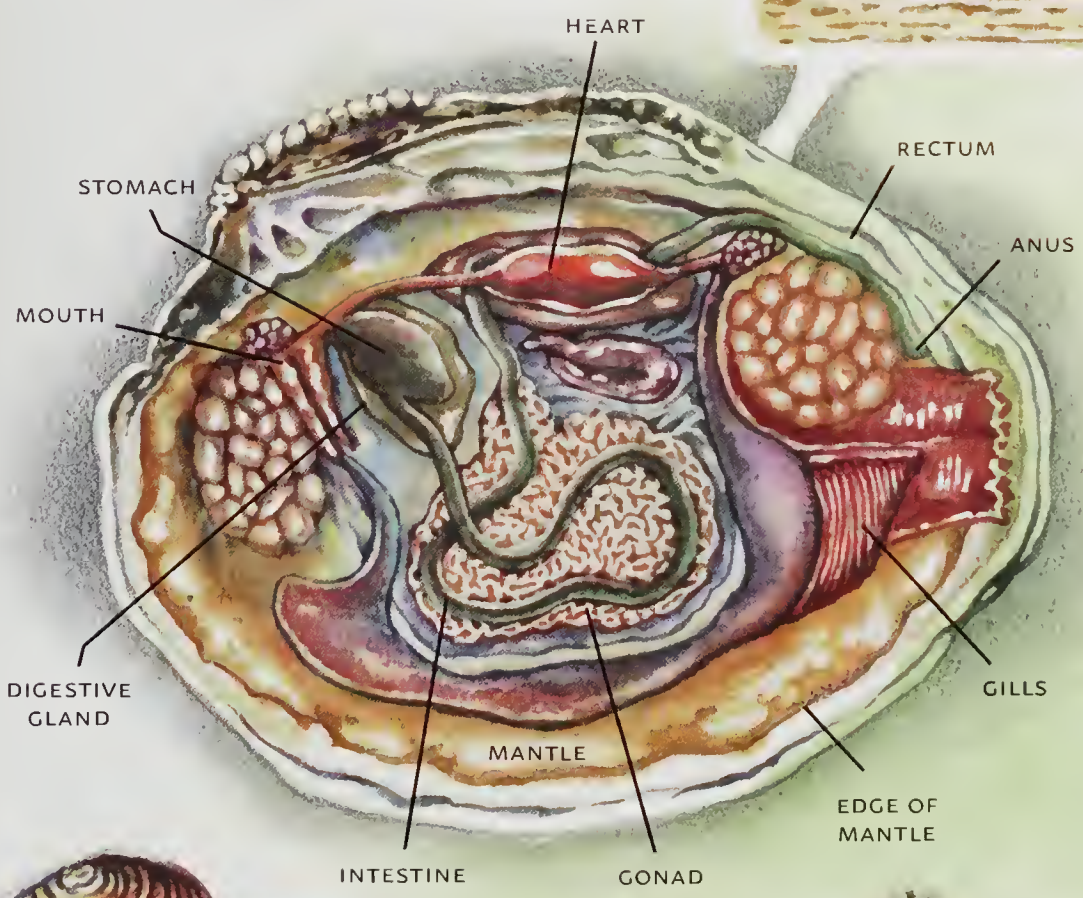
Why Are Freshwater Mussel Shells "Pearly?"

written by Clyde Sorenson
illustrated by Jim Brown

FOR A SOFT, LUMPY, HEADLESS ANIMAL LIVING in the turbulent, dangerous environment of a flowing stream, like a freshwater mussel, a protective shell is essential. Mussels, like most other mollusks, manufacture their protective "homes" with a combination of calcium, minerals and protein; the ultrastructure of the shell not only makes it beautifully iridescent—it also makes it incredibly tough. The living animal inside the shell is clothed in a thin layer of living tissue called the mantle, which makes the shell. Within the mantle are the gills, digestive tract and reproductive organs.



The mussel shell has three primary layers. The outermost, and usually thinnest, is the periostracum, composed primarily of tough proteins. This layer is important in protecting the shell from abrasion, but its most important function is in regulating water balance. The prismatic layer, under the periostracum is composed of microscopic, vertical needles of calcium carbonate imbedded in a protein matrix. The innermost, and thickest layer, is the nacreous layer. The two outer layers are produced only at the edge of the mantle, while the entire mantle secretes the nacreous layer.



The nacreous layer is composed of microscopic plates of another calcium mineral, aragonite, that lie parallel to the axis of the shell, and these, again, are imbedded in a protein matrix. The plates overlap much like bricks in a wall, giving the shell tremendous strength and resistance to puncture. The protein matrix reduces the brittleness of the shell and also protects the calcium minerals from acid waters. The shell is iridescent because these horizontal plates scatter and reflect light, depending on the angle one views the surface from.

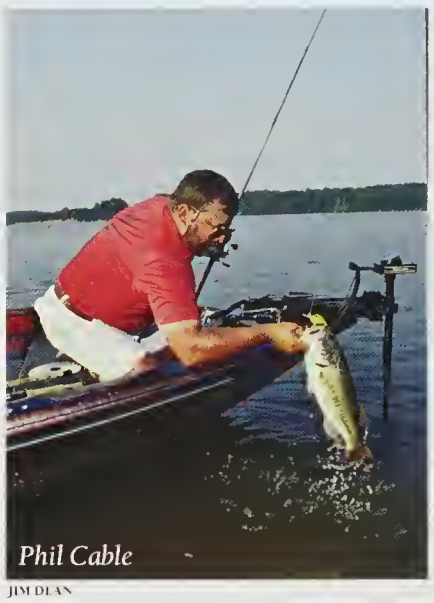
Shell shape and thickness varies with the habitat the mussels choose. Still water species have thin shells, while those living in high gradient streams have thicker ones.

Dog Days Bass

written by Jim Dean

There's an old adage that neatly sums up an important step in the human learning process. It's when we discover that "what we absolutely know for sure just ain't so."

It was, for example, once common knowledge that largemouth bass fishing would be poor — often even a near waste of time — on big lakes during the so-called "dog days" of summer. Those dog days, by the way, are generally associated with the bright star Sirius — the Roman Dog Star — and include much of July and August, though the ancient Greeks had a somewhat different notion of the origin and length of this period.


Phil Cable

JIM DEAN

Before about 1970, most fishermen assumed that bass retreated to deep water — few had any clue exactly where — and became semi-dormant. Many of us — especially those who fished large impoundments in the Southeast — also arbitrarily extended the miserably steamy dog days through much of September because we knew from experience that fishing wouldn't likely improve until cooler weather and water temperatures arrived. It turns out, however, that what we knew "just wasn't so."

Two things changed our beliefs, and also the way we fish. Depth finders designed for fishermen began to gain acceptance, although the early ones did little more than reveal water depths. However rapid improvements through the 1970s into the '80s soon gave fishermen screens that revealed bottom contour, cover such as drop-offs, creek channels, stumps and logs, and even showed blips that were supposedly fish (though some of us initially suspected that these were faked by manufacturers). "Hey, you want to see fish; we'll add some." Advancing technology soon laid that suspicion to rest. Finally, fishermen could truly see what was in those mysterious depths, and today's depth finders are even more amazing.

"Find the right combination, and bass fishing is often good, sometimes spectacular."

Another important influence was the formation of the Bass Angler's Sportsman's Society (B.A.S.S.) in 1968, and the rapid widespread growth of tournament fishing in the decades since. These highly skilled competitors wasted no time putting depth finders to use, and began to develop tactics to find and catch bass, including those elusive dog-day largemouths.

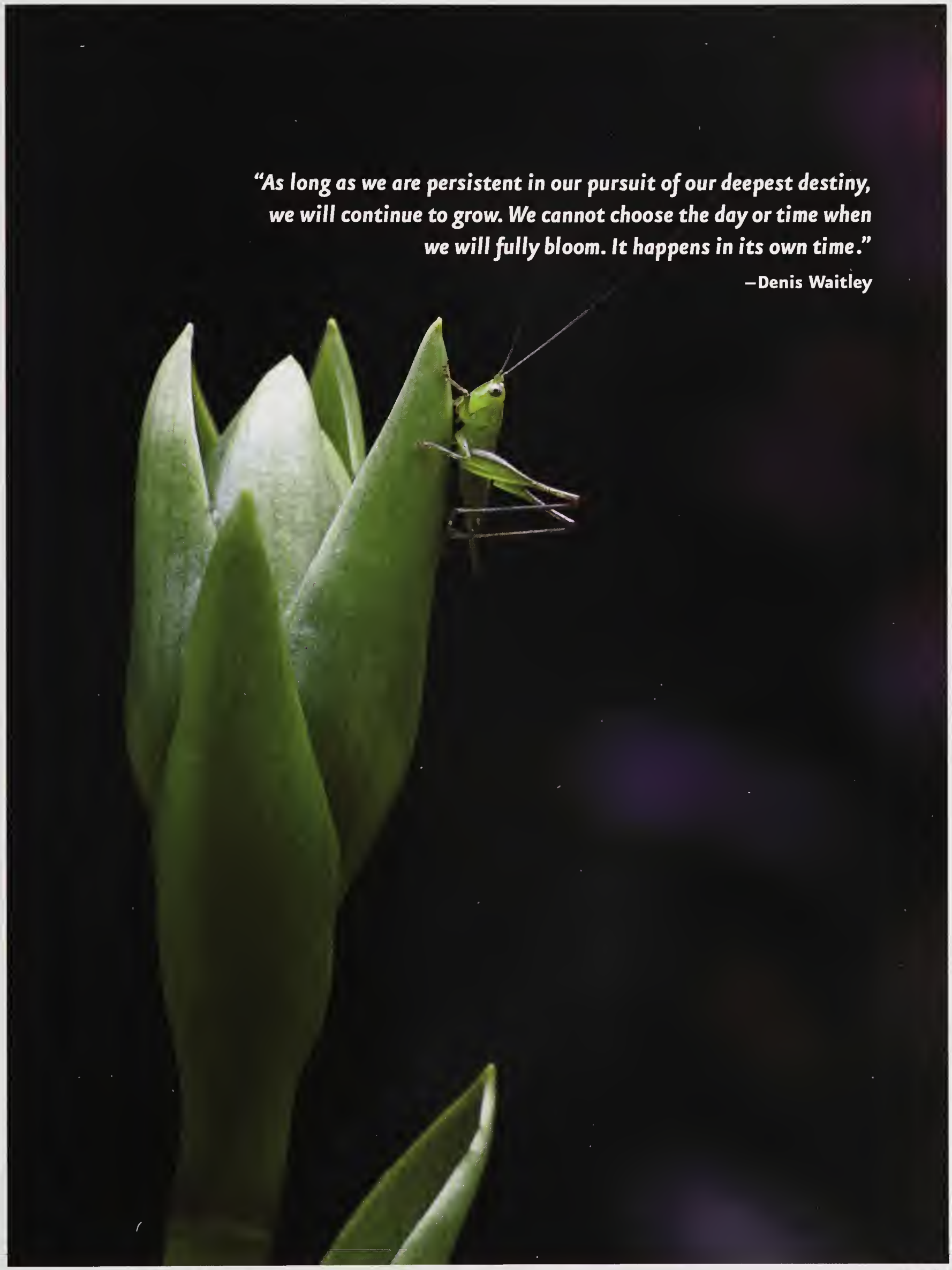
In the 1970s, I began fishing big lakes and impoundments with anglers — including some tourney pros — who were unlocking the secrets of hot weather bass fishing. My primary mentors were my old friends Phil Cable, Mike Gaddis and Jack Avent. Mike and Jack didn't fish tournaments, but they used similar tactics and were generous in sharing them. Phil was also happy to share his knowledge, and he was not only a successful early tournament fishermen, he also guided bass fishermen for years. I don't think Phil would be upset with me for revealing that he caught a 14-pound, 8-ounce largemouth and released it in front of stunned witnesses during a tournament weigh-in on Jordan Lake.

Depth-finder technology and tournaments confirmed and enhanced what many fisheries biologists already knew about the hot weather temperature and oxygen stratification of lakes, and how bass and other fish adapted. Fishermen realized that when lakes stratify into layers, bass are actually easier to locate because the places where conditions favor them are largely confined to a layer known as the thermocline. Simply stated, the water is often too hot for sustained comfort above the thermocline, and bass make fewer forays into it (and then mostly at dawn, dusk or at night). Below the thermocline, the cooler water often doesn't have enough oxygen to favor many species. Because of this, not only do bass concentrate in this thermocline layer, so do the prey species they feed on.

In hot weather, fishermen have learned to concentrate their efforts in the thermocline rather than waste time on unproductive water, and they use sophisticated depth finders to help them find it. They also look for favorable structure within this layer, and they've learned that those once suspect blips actually do reveal whether schools of bait and bass are using that structure. Find the right combination, and bass fishing is often good, sometimes spectacular.

Years ago, Phil showed me how to use big-lipped crankbaits on bait-casting cranking sticks with 10-pound test to fish humps, dropoffs, channels and similar structure at depths of about 9 to 14 feet (which is where we usually found the summer thermocline). The light mono permitted longer casts and helped the crankbait achieve its maximum depth. Where the structure impeded the use of crankbaits — heavy brush or a very rough bottom, for example — Phil often switched to Carolina-rigged soft plastics behind a fairly heavy sliding weight (one ounce, sometimes heavier). He also used Carolina rigs when the thermocline was deeper and beyond the reach of crankbaits.

Those tactics still work, and technology, tackle and skills continue to evolve. For sure, no knowledgeable hot-weather bass fisherman nowadays takes that Dog Star and poor fishing equation Siriusly.



JENNA CALLENDER

Katydid

IN THE SEPTEMBER · OCTOBER ISSUE

MELISSA McGAW / NCWRC

RITE OF FALL
Come celebrate the opening of dove season in the South with a traditional family shoot.

ANT APPEAL
Few flies can match the appeal of a black ant for trout or panfish. And few also are as easy to tie.

LIVING OFF THE LAND
The locavore lifestyle is gaining interest and bringing new people into hunting.

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